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Non-Biface Assemblages in Middle Pleistocene Western Europe.

A comparative study.

by

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Abstract

This thesis presents the results of an investigation into the Clactonian assemblages of Middle Pleistocene souther Britain. By exploring other non-biface assemblages (NBAs) reported from elsewhere in Europe it seeks to illuminate our understanding of the British assemblages by viewing them in a wider context. It sets out how the historical and geopolitical context of Palaeolithic research has influenced what is investigated and how, as well as interpretations of assemblages without handaxes. A comparative study of the assemblages themselves based upon primary data gathered specifically for that purpose concludes that while there are a number of non-biface assemblages elsewhere in Europe the Clactonian assemblages do appear to be a phenomenon unique to the Thames Valley in early MIS 11. However, traditional explanations for this phenomenon, such as cultural variation, cultural migration and pioneer populations are challenged and a new interpretation centred on the concept of a *default flaking pattern* is proposed.

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Declaration of Authorship

I, Hannah Louise Fluck

declare that the thesis entitled

'Non-Biface Assemblages in Middle Pleistocene Western Europe. A comparative study.'

and the work presented in the thesis are both my own, and have been generated by me as the result of my own original research. I confirm that:

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Chapter One

The Clactonian in its historical context

Introduction

The aim of this thesis is to explore the phenomenon of the 'Clactonian', a collection of assemblages from Middle Pleistocene Britain from which handaxes appear to be absent. While debate has raged about whether the Clactonian is indeed an indenpendently identifiable phenomenon (e.g. Ohel 1977, 1979; McNabb 1992, 1996; McNabb and Ashton 1995; White 2000) there has been little work to consider these assemblages in a wider, pan-European context. This thesis takes a definition of *non-biface assemblages* (NBAs) (defined in detail in Chapter 2) and seeks to identify instances of Middle Pleistocene assemblages without handaxes elsewhere in Europe so that comparisons can be made and the Clactonian considered with a broad perspective.

The key questions I am seeking to answer are:

- What is the Clactonian?
- Are there other non-biface assemblages in Europe?
- If so, are they similar to the Clactonian?
- To what extent does an absence of bifaces make these assemblages similar?
- What can a broader investigation of Middle Pleistocene non-biface assemblages tell us about the Clactonian phenomenon in Britain?
- If there are differences between these non-biface assemblages what are they and why?

Clactonian in its historical context

Theoretical discussions in Archaeology over the past few decades have increasingly drawn attention to the culturally embedded nature of our perceptions and interpretations of both the present and the past. As a result a number of publications have explored the history of archaeology as a discipline and the dialogue between national/cultural identities and archaeology (e.g. Atkinson, Banks, and O'Sullivan 1996; Daniel 1950, 1975, 1981; Díaz-Andreu 1998; Groenen 1994; Härke 2000; Malina, Vašiček, and Zvelebil 1990; Meltzer, Fowler, and Sabloff 1986; Trigger 1989).

The Clactonian as a non-biface phenomenon, and the interpretations and identification of other NBAs in Europe must be viewed within such a historical context. For the British Clactonian the interpretations and even the identification of such assemblages have been heavily influenced by the historical development of Prehistoric Archaeology in general and Palaeolithic research in particular. This is particularly significant given the variety of typological approaches taken to non-biface assemblages (e.g. Molines 1999; Vértes 1990; Querol and Santonja 1983; McNabb 2007). The typological approaches reflect the philosophical and interpretational trends in the development of the discipline. The variation in these approaches and a lack of first hand comparison of the collections has led to some interpretations attaining almost myth-like status (the chopper-chopping tool microlithic industry at Vertésszőlős - for example - see Bridgland *et al.* 2006; White 2000 and Chapter 4 of this thesis). This chapter will explore some of the key differences that have emerged in European Palaeolithic archaeology and the role which these different schools of thought have played in the differing interpretations of Middle Pleistocene NBAs. From my reading on the subject of NBAs in Europe it has become increasingly apparent to me that the debate surrounding the Clactonian in Britain is the exception rather than the rule. The Clactonian debate in Britain has centred principally on whether the assemblages described as Clactonian, characterised by an absence of bifaces, are genuinely different from the broadly contemporaneous Acheulean assemblages. Some have argued that although bifaces are largely absent the assemblages are essentially the same as the Acheulean (e.g. Ashton and McNabb 1994; McNabb 1992, 1996; Ohel 1977, 1979), while others have argued that the Clactonian assemblages should be considered a unique phenomenon distinct from the Acheulean (e.g. Wenban-Smith 1998; Wenban-Smith *et al.* 2006; White 2000). By looking in more detail at the history of Palaeolithic research in other areas of Europe I hope to shed some light on why the Clactonian debate seems to be such a peculiarly British one.

The early history of Palaeolithic archaeology is largely shared across the countries of Western Europe. The pioneers of the Palaeolithic were constantly hopping across borders to see what had been found in neighbouring countries and research was undertaken at a truly global scale, none more so than that of the Abbé Breuil who visited sites across Europe, the far east and Africa (e.g. Breuil 1913). This was at least in part due to an underlying belief that human development progressed through universal stages which could be expected to occur, albeit at different points in time, all over the world. Over the past fifty years and probably more, as knowledge and information about the Palaeolithic has grown the search for universals has diminished. Researchers have also become increasingly specialised, making such an international approach less practical. Inevitably the increasingly isolated day to day environment in which most research is undertaken has led to the emergence of a number of academic traditions which are largely centred on national styles of interpretation. Building upon the work of Trigger and others (e.g. Trigger 1989; Groenen 1994; Härke 1995, 2000) I have identified five key schools of influence on prehistoric research in the past century: The Anglo-Saxon School (although considerable differences exist between British and US approaches); The French School; the Soviet School; the German School; and the Scandinavian School. Given the geographical and temporal focus of my research the Scandinavian school is of little relevance here but its influence on the approaches of other areas is acknowledged. These schools, their approaches to Palaeolithic archaeology, their development and realms of influence will be discussed here with particular reference to the status, identification and interpretation of NBAs. It is argued that the Clactonian debate is one that is peculiarly Anglo-Saxon in approach and that in order to begin to consider NBAs within a wider European context it is vital that we look at how approaches to them have been influenced by differences in national archaeologies.

NBAs are almost by definition typologically problematic: they are, for the most part, characterised by an absence of particular artefact types, i.e. bifaces, usually used by archaeologists as diagnostic tools. Typologies are created to define assemblages on the basis of what 'types' are present rather than absent, therefore, NBAs buck the trend and challenge definitions of what is normal. They also rarely play a part in mainstream international discussions about European Middle Pleistocene industries. As a result they are perhaps more susceptible to, or more indicative of, local and regional archaeological traditions and approaches. In this way they can provide a fascinating insight into the historical and theoretical identity of particular regional archaeological traditions. However, the other side to this coin is that the way that the information is not only interpreted but also gathered and presented may vary considerably between regions making broad inter-national or inter-regional metadata comparisons extremely difficult.

Part 1: Britain and NBA research

Named after the localities at Clacton-on-Sea, Essex, where it was first identified, the history of the British Clactonian follows the development of Palaeolithic archaeology in Britain over the past century. In particular, later development of the Clactonian debate reflects the development of a particular Anglo-Saxon approach to the Palaeolithic from the emergence of the New Archaeology of the 1960s to the aftermath of post-processualism.

Flakes and cores

At the end of the nineteenth and beginning of the twentieth century Lower and Middle Palaeolithic assemblages fell into one of three categories: Eoliths, Acheulean and Chellean handaxe industries, or the Mousterian flake industries, largely following the progressive scheme developed by the French Palaeolithic pioneer de Mortillet in which each stage was more advanced than the previous one (Collins 1986; Wymer 1968b). However, during the first few decades of the twentieth century the idea of progressive epochs was beginning to be challenged (e.g. Breuil 1913) and discoveries were being made from a number of sites in southern England that did not appear to fit into these accepted categories (Smith and Dewey 1913; Warren 1911a, 1922, 1923).

The first of these was Clacton-on-Sea which had been known as an important site for Pleistocene mammalian fauna but which reached the attention of Palaeolithic archaeologists at the beginning of the 20th century (Kenworthy 1898; Warren 1911a, b, c). The Clacton artefacts – consisting of simple cores, flakes and flake tools - did not fit into the accepted categories of the day: they were not eoliths, but nor were they handaxes; they consisted of flakes and flake tools but were not Mousterian. The ubiquitous Abbé Breuil offered a solution to this typological enigma by noting the similarity between the Clacton-on-Sea artefacts and those from Mesvin, Belgium when he viewed Warren’s collection (Warren 1922). In the subsequent paper Warren suggested that this ‘Mesvinian’ industry was not connected to the Chellean or Acheulean, being contemporary (or slightly earlier) but that it might possibly be a precursor of the later Mousterian. This suggestion fitted in with developments in global Palaeolithic typologies which were increasingly allowing for contemporary core and flake traditions, in particular with the work of Hugo Obermaier on the Palaeolithic of Spain, Italy and Switzerland (Groenen 1994; Obermaier 1924; Trigger 1989). The term

‘Clactonian’ was introduced by Warren in a footnote (Warren 1926; McNabb 2007; Collins 1985) and not by Breuil as often suggested (e.g. Wymer 1968a,b). This name change was due to the discovery of handaxes at the Mesvin site where the two industries (Clactonian and a newly defined Mesvinian) were separated on the basis of the presence and absence of this *fossile directeur.*

The peculiarity of the discoveries at Clacton may have gone relatively unnoticed but for the fact that they were not isolated discoveries. The Swanscombe localities of Barnfield Pit and Rickson’s Pit were also yielding similar assemblages (Dewey 1930, 1932, 1959; Smith and Dewey 1913). Similar flints were also being collected from Little Thurrock by B. Wymer, although the material from this site was not in fact published until 1957 (by his son John Wymer), partly because at the time the time their collector did not know what to make of the artefacts (Wymer 1957, 1968a).

By the 1930s the Clactonian was embedded in the British Palaeolithic with syntheses by Breuil (1930, 1932a, 1932b), Warren (1922, 1923, 1926, 1932), Chandler (Chandler 1930, 1932), Oakley and Leakey (Oakley and Leakey 1937), and Smith and Dewey (Dewey 1930, 1932; Smith and Dewey 1913). However, while it was agreed by all that this industry was distinct from other Palaeolithic industries in its lack of bifaces, the positive characteristics that precisely defined these assemblages as Clactonian were far harder to agree upon. For Breuil the Clactonian was characterised by the presence of flakes with low flaking angles, wide striking platforms and prominent percussion cones and bulbs (Breuil 1930, 1932a, 1932b) even to the point that he would classify isolated artefacts rather than considering entire assemblages. Despite experimental work by Baden-Powell (1949) suggesting that these ‘characteristic flakes’ are merely the result of hard hammer percussion, and more recently work by Ohel supporting this (Ohel 1979), the term ‘Clactonian flakes’ is still used by some authors on the continent as a descriptive term (E.g. Lhomme 2007; Molines 1999; Palma di Cesnola 1996). Breuil’s emphasis on the flakes as the important aspect of the Clactonian contrasted with Warren’s approach who considered the cores to be the tools and the flakes to be largely by-products (Warren 1922, 1934). Whether the Clactonian is primarily a core or a flake assemblage is a debate that continued into the 1970s (Ohel 1979), although in the early-mid twentieth century Warren’s view of the Clactonian as a primarily core based industry was in a minority with Oakley and Leakey also following Breuil’s interpretation (Oakley and Leakey 1937).

The acceptance of the Clactonian as a ‘flake-industry’ in the 1930s strengthened the concept of flake cultures (e.g. Clactonian, Levalloisian, and Mousterian) as opposed to core-tool cultures (e.g. Abbevillian and Acheulean). However, there were doubters of this clear-cut distinction and Oakley, like Warren, began to consider the possibility that the Clactonian may be related to the Choukoutien-Soan core and flake industry of the Far East (Oakley 1949) - possibly as an ‘early offshoot’. The general ‘Big Picture’ (See Dennell 1990) approach of this period meant that new finds were fitted in to a broader, pre-existing view of steady development rather than challenging that view. At this point the Clactonian was a term that was applied to assemblages across Europe – Breuil himself was noting Clactonian assemblages from Portugal (Breuil, Vaultier, and Zbyszewski 1942), and France (Breuil 1932a) and others later identified Clactonian assemblages from Italy (see Palma di Cesnola 1996 for examples). The Clactonian as a concept was entrenched in the European Palaeolithic schema not just the British Lower Palaeolithic.

After nearly half a century of work at the site Hazzeldine Warren published his definitive paper on the finds from Clacton-on-Sea (Warren 1951). Despite the earlier debates surrounding core vs. flake industries he maintained that the industry was primarily a core tool industry (see McNabb 2007 for a summary of his peculiar definitions of cores). He also included no discussion on the internal ‘progressive evolution’ of the Clactonian that Breuil had emphasised (Breuil 1930). Rather, Warren, now influenced by the work of Movius in identifying the chopper-chopping tool complexes to the east of his famous line across Asia, suggested that in the same way that the Asian chopper tools were conditioned by the raw material, so the Clactonian manufacturers were restricted by the knobbly nature of irregular flint nodules. While he did see a line between the early pebble tool industries identified by Leakey in Africa and Movius in Asia he did note that similar artefacts can be found right through to the Neolithic, and that as such it is difficult to make a judgement about the evolutionary standing of the industry (Warren 1951). Both these points – the role of raw material in the shaping of an industry, and the idea that even more technically advanced cultures still make simple tools when it suits them, have continued to play a key role in the debates surrounding the significance and of NBA industries.

A very British phenomenon

The earlier view of evolutionary change as steady and progressive was shattered by the demise of the European empires and World War Two (Dennell 1990). The emergence of the New Archaeology of the 1960s and 1970s heralded a new age in archaeology; echoing transformations occurring in other human sciences the principal intention of this new generation of archaeologists was to objectify archaeological research and to establish its scientific basis. No longer solely concerned with fitting Palaeolithic sites into a linear evolutionary sequence, research began to consider the spatial and temporal distribution of sites and artefacts. Perhaps key in enabling a move away from the focus on vertical sequences were the advances in scientific dating techniques which allowed absolute dates to be obtained for sites without the need for complex stratigraphic and typological comparisons. However, while these new techniques and approaches certainly revolutionised Palaeolithic archaeology elsewhere, and later prehistory in the UK, such dating techniques could not (and often still can't) be applied to many of the British Lower Palaeolithic sites which are in secondary contexts and rely upon other geo-chronological dating methods. Nevertheless, the Clactonian was no longer simply a phenomenon and a technological stage that needed to fit into a neat evolutionary sequence and the debate opened up to explore other possible explanations for the particular nature of this industry.

Another significant change in the approach to Palaeolithic archaeology in the post-war period was the consideration of whole assemblages rather than relying on the presence of particular artefact types or type fossils to characterise the assemblage. This earlier practice had resulted in some interesting hybrid terms, e.g. Clacto–Abbevillian, Acheulio-Levalloisian, where more than one type occurred in a single assemblage. Francois Bordes was one of the pioneers of whole assemblage analysis (Bordes 1953; Bordes and Bourgon 1951) and this move away from *fossiles directeurs* to systematic typology and statistical indices was one of the greatest changes to Palaeolithic research of the past century. Today the Bordes Typology for the Lower and Middle Palaeolithic (Bordes 1961) is one of the most widely used and universally understood systems for stone tool analysis in the world. It is not without its problems however and as we shall see in subsequent chapters the inability to apply such universal typologies to many Middle Pleistocene Non-Biface Assemblages is one of the reasons they have been poorly documented and little understood.

The combined influence of a new approach to lithic technology and a more rigorous contextualisation of the assemblages meant that the use of the term 'Clactonian' began to fall out of favour in the rest of Europe, although it hung on with certain researchers particularly in the Italian peninsula. The boom time for UK Clactonian field investigations in the 1960s and 70s, with excavations at Little Thurrock (Snelling 1964), Clacton Golf Course (Singer *et al.* 1973) Barnfield Pit (Ovey 1964; Waechter, Newcomer, and Conway 1970), and Purfleet (Palmer 1975) meant that the question of the definition and interpretation of the Clactonian was very much focused upon the UK. Joint Anglo-American projects, like that at Clacton-on-Sea, funded by the University of Chicago were also undertaken at Hoxne between 1972 and 1974 and again in 1978 (Singer, Gladfelter, and Wymer 1993), and in 1979 at Barnham St Gregory (Wymer 1985). British Lower Palaeolithic field research was in its heyday.

While the Clactonian lithic assemblages were growing with the results of these excavations, important advances in pollen and mollusc studies had enabled a detailed review of the Hoxnian interglacial, and allowed these sites to be placed within the subdivisions of the Hoxnian - the interglacial traditionally associated with the Clactonian. Although these data had been previously applied, these advances alongside a greater understanding of the Pleistocene climatic cycles provided by marine/terrestrial cores and isotope studies, revolutionised the geochronological understanding of the British Pleistocene. It was found that the Clactonian assemblages at Swanscombe and Clacton-on-Sea were earlier than the Acheulean industry identified at Hoxne. Such a picture was repeated at other Clactonian sites and the Clactonian was interpreted as the earliest industry in Britain. Although some, such as Waechter, hesitated in assigning the Clactonian label too swiftly to newly discovered assemblages, by and large the validity of the Clactonian assemblages as an independent phenomenon was not questioned.

The nature of the British Pleistocene archaeological record itself has undoubtedly influenced the interpretation of the Palaeolithic. The lack of absolute dating opportunities such as those available in Africa, the lack of deep stratigraphic sequences like those seen over the channel in France and the secondary context nature of many of the sites were extremely limiting on the methods available to Palaeolithic archaeologists working in the area at the time; indeed they still pose a considerable challenge today. John Wymer's 1974 Stopes Memorial Lecture for the Geologists' Association (Wymer 1974) illustrates the influence of these problems on the interpretation of the Palaeolithic record. Wymer attempted to fit the environmental information from the pollen and molluscan research of the day with the findings from the lithic record and this tradition of collaboration between palaeoenvironmental studies and the analysis of the lithics has been characteristic of Palaeolithic research, particularly of the Lower Palaeolithic, in Britain ever since.

Wymer used these pollen and molluscan data to show that the temporal gap between what he saw as the earlier Clactonian and the ensuing Acheulean was very slight. He argued that such a sudden change from Clactonian to the Acheulean meant that rather than a gradual development the former must have been replaced by the latter. Implicit in this idea of replacement of industries was the replacement of populations: the 'Clactonian making people' were replaced by the incoming Acheulean handaxe makers. This replacement approach was not peculiar to the Palaeolithic but was reflected in interpretations of other periods of British prehistory, as highlighted by Grahame Clark (Clark 1966), reflecting an approach to Britain's Island identity as one of population and cultural replacement.

Wymer, like many of the scholars who followed him (e.g. Ohel, McNabb, Ashton etc) never made any comparisons with European sites, further isolating the assemblage. A few others (e.g. Collins 1969) did look further afield, seeking to relate the non-biface Clactonian to the handaxe-free zone of central and eastern Europe, postulating that these areas may be where the non-handaxe-making Clactonian people originated. For other scholars though, the presence of other core and flake industries in Lower Palaeolithic Europe were a tacit validation of the presence of the Clactonian in Britain, while the Clactonian itself was becoming more and more British.

The end of the 1970s saw the beginning of a period of questioning the very idea of the Clactonian as a separate industry. Ohel (1979) considered the idea that the Clactonian sites were not a separate industry but rather represented areas where the Acheulean knappers were preparing raw material to take elsewhere and produce handaxes. Emphasising similarities in the knapping strategies of the two industries he drew upon empirical evidence to support these inferences. Most importantly, he used archaeological data to demonstrate, as Baden-Powell had previously with experimental data (Baden-Powell 1949), that the Clactonian flakes Breuil had identified as characteristic of the assemblages were in fact a widespread phenomenon characteristic of hard hammer percussion in general. He also demonstrated that many assemblages from earlier Clactonian excavations displayed collection biases towards 'Clactonian' types and probably did not reflect the complete assemblages. The Clactonian debate as we know it today had begun – the question was no longer what the Clactonian represented in terms of chronological, evolutionary or cultural stages but whether it could be described as a separate phenomenon at all.

It is interesting that it took an American scholar to start this debate. Interesting too is the level of hostility to Ohel's proposals amongst British archaeologists at the time (see responses to Ohel 1979). During the 1980s and 1990s this debate was to continue (e.g. McNabb 1992, 1996; McNabb and Ashton 1995), becoming one of the key debates in British Palaeolithic research.

The 1980s to today: current debates on the Clactonian

While the 1980s saw the arrival of Post-Processual archaeology, with its' emphasis on the non-empirical aspects of archaeology: individuals, societies, beliefs, cultures, most of these changes passed Lower Palaeolithic research by; most, but not all. There was a move to consider the social and behavioural aspects of stone tool technologies, looking beyond the ideas of the New Archaeology which had focused on functional or progressively developmental explanations for stone tool variation.

These changes in approach were set against a background of considerable advances in geochronology as scientists began to link together marine core records, ice core records and terrestrial glacial sequences. The result was a greater level of understanding of the complex climatic changes *between* and *within* the glacial and interglacial sequence. This work meant that the chronological understanding of the Pleistocene changed dramatically during the 1980s. From having been considered to date to c. 250ka prior to the 1980s the Clactonian sites were now considered to be nearly double that age.

It was not just the age of the sites that were challenged, the accepted technological sequence was also shaken. The discovery of Boxgrove (Roberts and Parfitt 1999) during the same decade pushed back the dating of the Lower Palaeolithic in Britain to c.500ka with handaxes now apparently predating many of the Clactonian sites. This presented a further challenge to any ideas that non-biface assemblages predated biface assemblages in Britain. Similarly the problem with using typology as an indication of antiquity was highlighted by the findings from excavations at the site of

High Lodge (Ashton, Cook, and Rose 1992), another site where the typology of the tools was considered to be more developed than expected for the dating of the site. These were revolutionary discoveries and forced a whole suite of new questions about the relationship between typology, technology and Palaeolithic behaviour – technology and typology could no longer be relied upon as a chronological indicator. The Clactonian could also no longer be seen as ancestral to or preceding the Acheulean. The possibility of two contemporary industries in the British Lower Palaeolithic was once more a possibility.

Running parallel to many of these discoveries were debates about whether or not the Clactonian could really be defined as a separate phenomenon, distinct from the pene-contemporaneous Acheulean. One of the leading proponents of this view was John McNabb who throughout the 1980s and 1990s explored in detail what distinguished the Clactonian from the Acheulean, arguing strongly that the Clactonian did not stand up to scrutiny as an industry in its own right, largely on the basis of the presence of a few atypical handaxes within these assemblages (e.g. McNabb 1992, 1996). Instead McNabb argued that the relative lack of handaxes at these sites was not indicative of a separate industrial tradition but rather indicative of the flexibility of hominin behaviour at those particular places and times (See McNabb 2007 for a reflective review). For McNabb and many others the Clactonian was simply the Acheulean without bifaces.

This view was strengthened by the detailed research undertaken by the British Museum at East Farm, Barnham in the early 1990s (Ashton *et al.* 1994; Ashton, Lewis, and Parfitt 1998). This site had previously been believed to demonstrate that the Clactonian chronologically preceded the Acheulean, however the re-excavation revealed a far more complex situation. The excavators suggested that rather than consisting of two stratigraphically distinct industries, the Acheulean and the Clactonian assemblages represented different localities, possibly for different activities, within a complex landscape of differential tool use.

The outcome of the past two decades of geochronological and biostratigraphic research, particularly with regard to fluvial deposits, is that the majority of Clactonian sites are now considered to date to MIS 11 (McNabb 2007). Although, further research, in particular by Mark White, has suggested that Clactonian sites may also be present at the end of MIS 10 and beginning of MIS 9 (Cuxton and Purfleet: White, Scott, and Ashton 2006; White 2000; White and Schreve 2000). White has suggested that the association of Clactonian assemblages with early interglacials represents a pioneer stage in the occupation and reoccupation of Britain: either because the population density at the time could not sustain the skills necessary to manufacture handaxes or because the pioneer settlers may have come from areas where handaxes were not routinely made (White 2000).

For many, certainly for the majority of colleagues on the continent, the work of McNabb and others was the final comment in the Clactonian debate (e.g. Byrne 2001; Fernández Peris 2006; Jaubert and Servelle 1996; Raposo, Margarida Salvador, and Pereira 1996). For many of these researchers the persistence of this debate is something peculiar to British Palaeolithic archaeology (e.g. Fernández Peris, Valencia Museum; A. Marko, Hungarian National Museum; N. Goren-Inbar and G. Sharon, Hebrew University; A. Turq, National Museum of Prehistory, France: all pers. comms.). However, the debate has recently found renewed vigour with fresh discoveries by Francis Wenban-Smith at Ebbsfleet have adding new fuel to the fire (Wenban-Smith *et al.* 2006). As Mark White has pointed out, while previous arguments against the existence of the Clactonian as a separate phenomenon raised some valid points they failed to offer satisfactory explanation for the variation observed in the record (White 2000). In arguing that the discussion regarding the Clactonian has not yet run its course he turns to the wider European context to postulate some scenarios for non-biface assemblages. He set out four descriptions of the possible context of occurrence of NBAs: firstly as very early occupations predating the use of handaxes; secondly, regions where handaxes were not made; thirdly, chronologically discrete periods when handaxes do not occur in regions where they are found at other times; and fourthly, occasional occurrences of NBAs geographically and chronologically contemporaneous with handaxe assemblages. Although White's paper is primarily setting out descriptive scenarios for future analysis, McNabb has noted that there are strong cultural undertones to his argument (McNabb 2007). The revival of cultural explanations is more clearly stated in the recent work of Wenban-Smith with the Clactonian seen as part of the cultural ebb and flow of technological change and variability, driven by social learning (Wenban-Smith 1998, 2004; Wenban-Smith *et al.* 2006). In many ways the debate has come full circle – there are more than a few echoes of a cultural historical approach in this recent discussion. However, to date, a systematic comparison with the European data has not been undertaken.

Part 2: A European perspective

French approaches to Palaeolithic archaeology

Although there are differences between the British and the American research traditions there is perhaps a greater degree of idea sharing between researchers in the English speaking world due to the common language. Hence, broadly speaking, we jointly progressed from culture-history archaeology to the 'New archaeology' in the 1960s, felt the shift to Post-Processual archaeology in the 1980s and are currently finding our feet in a Post-Post-Processual archaeological world together.

While there have been theoretical shifts in French archaeological approaches these have not necessarily paralleled those of the English speaking research world. Although there are some superficial similarities, the underlying approaches are quite different, indeed Francoise Audouze and Andre Leroi-Gourhan have referred to French archaeology as a 'continental insularity' (Audouze and Leroi-Gourhan 1981).

As in Britain, Palaeolithic archaeology in France dates back to the birth of the subject in the nineteenth century. Since then it has been held in fond regard by French archaeologists and the French public, due, in part, to some spectacular discoveries (particularly in the Dordogne area), impressive examples of Upper Palaeolithic parietal art and the sheer quantity of Palaeolithic archaeology. It is no accident that so many typological and chronological terms in use in Palaeolithic nomenclature today are of French origin; a large proportion of the great characters in the development of Palaeolithic archaeology have also been French. As a result Palaeolithic research has traditionally held a strong position in French archaeological research, to the envy of many Palaeolithic researchers elsewhere.

The prominence given to Palaeolithic research in France, and some of the particular aspects of the French tradition, can perhaps be traced as far back as the French revolution and should be considered within a broader picture of the relationship between the state and the research community. State sponsorship of French scholarship began in the seventeenth century with the setting up of scientific and literary 'academies' under Royal patronage, and since this time state sponsorship has played a crucial role in the research communities (Heffernan 1994). The influence of the state on research in all areas of science increased following the revolution in a political atmosphere that sought to place scientific research within a broader rational, republican world view. It was also shortly after the revolution that the Musée des Monuments Français was established (Kohl 1998). Research and the public interest in it became entrenched in the French national identity as successive republican governments set up and funded national research groups such as 'Service de Missions', 'Académie de Sciences', 'Comité des Travaux Historiques', and, most recently, in 1939 the 'Centre National de la Recherche Scientifique' which is responsible for a considerable amount of the Palaeolithic research undertaken today. The eagerness to encourage scientific research in the broader sense has had an effect on the definition of archaeology that has, in many ways, benefited the Palaeolithic in particular with its close associations with the sciences of biology and geology. Rather than growing up within a historical school of thought as archaeology has in the UK (and against which Anglo-Saxon Palaeolithic archaeology has often struggled), in France archaeology has developed as a human science, within a broader liberal humanist definition of science. Hence the 'New Archaeology' that had such a profound effect on archaeological thought in the Anglo-American research community barely brushed the surface of the French archaeological consciousness, or rather was subsumed within existing traditions. Interestingly while the debates about 'New Archaeology' did not take place, there were debates about the possibility of a 'new history' (Olivier and Coudart 1995). There was already an established tradition in France of systematic fieldwork, site spatial analysis and experimental approaches, and perhaps most significantly to understanding differences in the approach to lithic analysis, a strong tradition of refitting lithic material and knapping experiments. The approaches of Binford, Clark, and Renfrew, that had changed the Anglo-American archaeological approach, and challenged some of the findings of the hero of French Palaeolithic research, Francois Bordes, were barely acknowledged (Audouze and Leroi-Gourhan 1981). The new emphasis on site formation processes that Binford was encouraging was more or less what French researchers had been doing for years. As previously discussed French Palaeolithic research had always been an empirically based approach strong on artefact analysis and as such by the time the New Archaeology arrived in Britain and America, the Bordes assemblage based approach was already in place.

Within French archaeology, in particular prehistoric archaeology, there has been a tendency to look for *in-situ* explanations of changes in the archaeological record. This has been reported for the Iron Age (Fleury-Ilett 1996) but can also be seen in the

Palaeolithic. There are several descriptions of local industries which develop, in-situ, into later, more advanced techniques: for example the Evenosian or the Tayacian which have been argued to be facies of the Acheulean that later developed into the Mousterian in central and southern France (de Lumley 1976; de Lumley and Barsky 2004). This could be contrasted with the British approaches which, where differences are identified, have tended to appeal to outside influence, for example the 1950s explanations of the Clactonian (Wymer 1957*). In France the explanation of change was traditionally internal; in Britain the explanation of change had been traditionally external* (see Clark 1960 for a rebuff of this). This French concern for *in-situ* explanations of change can be related, as Fleury-Ilett has done for the Iron Age, to the emergence of an archéologie nationale in France in the 1970s. This, in turn, has its origins in the prominent public interest and state sponsorship of research in France, which, as we have seen above, has a long history. The involvement between state archaeology and public interest is nicely summarised by the publication in the 1980s of an impressive popular volume on French archaeology in France, the result of a conference organised by Francois Mitterand, the then French President (Goudineau and Guilaine 1989). Unsurprisingly such sponsorship has encouraged research by French researchers, into French archaeology, on French soil, resulting in a 'national archaeology', although Fleury-Ilett is keen to distinguish this from 'nationalist archaeology' (Fleury-Ilett 1996). It could also be argued that such a national approach, as well as partly resulting from such prolonged public interest and funding, was influenced, following the tumultuous history of the first half of the 20th century, by the need to reconfirm French identity: a cultural-historical way of identifying and reconfirming boundaries. Perhaps this led to the 'continental insularity' observed by Audouze and Leroi-Gourhan? By contrast as a physical island and one whose history, particularly prehistory, has been dominated by successive incomings and invasions (which have all been included or embraced in a sense of national identity) historically British archaeologists feel less of a need to look for *in-situ* development of techniques, a feeling that is supported by the more distant role played by public funding and state interest.

The development of such approaches, with their focus on the *in-situ* development of techniques and local patterns of change, is not solely due to the politics of the past in France. With regard to the Palaeolithic the nature of the archaeological record has played a substantial part in the shaping of the research approaches and traditions. The French record, unlike the British, and indeed that of the Iberian Peninsula, is blessed (or some may say cursed!) with a plethora of well stratified cave and rock shelter sites with long stratigraphic sequences (For example La Micoque (Chauvet and Riviere 1896; Rolland 1986), Caune d'Arago (de Lumley *et al.* 2004), Le Moustier (Peyrony 1930) etc.) some lasting the full length of the Pleistocene and into the Holocene. This has enabled detailed studies of small areas through substantial geological time. It could be argued that studies connecting changes in technology through time and focusing on small areas through such long time periods will almost inevitably find continuations which will suggest *in-situ* developments of techniques. By contrast the British record predominantly consists of spatially and temporally broad sites that have undergone varying degrees of disturbance. The sites are often within long geological sequences, where only a small number of the sedimentary units have produced archaeological material. Hence British archaeology has learnt to rely upon comparisons across considerable space rather than detailed time.

A good example of this, and relevant to the discussions surrounding NBA's is the recently discovered 'Colombanien' in the Armoricain peninsular of Brittany. This is an NBA assemblage type confined to this area. The excavator, Jean–Laurent Monnier does not believe it is a separate 'culture' but rather that it is a regional variation of the Acheulean associated with coastal locations (J-L. Monnier pers. comm.). In this sense Monnier is following from traditions of interpretation of regional variations within the Acheulean suggested by Bordes in which certain regional Acheulean traditions were characterised by a greater or lesser presence of bifaces (see Villa 1983 for an excellent summary of this). The local focus on detailed, long stratigraphic sequences has led to a greater understanding and acceptance of technological and typological variation. Within such a research environment it is difficult to imagine the status of the Clactonian being so hotly debated. It would have simply been seen as another variation of the Acheulean rather than something in need of particular explanation and redefinition.

The German School

While French and British archaeology was largely preoccupied with early prehistory, in particular Palaeolithic archaeology, the development of prehistoric archaeology in Germany (and to a certain extent similarly in Scandinavia and central Europe) could be seen as centred on later prehistory and the identification of different cultural/ethnic groups, with archaeology as a whole more focused on the classical world. Despite this principal association between classical archaeology and 'archaeologie', it is interesting to note that the first popular journal devoted to the study of prehistoric archaeology was published in Germany in 1719 by A. A. Rhode (Malina, Vašiček, and Zvelebil 1990).The German 'school' was particularly influential during the '*Culture-history*' phase of archaeology in the first half of the twentieth century; this was aided by the status of German as a *lingua franca* of the time for continental Europe. It is probably not coincidental that much of the data used to support the culture history approach came from Germany or central Europe, used in support of a movement of cultures and ideas from east to west (e.g. Childe 1925, 1958). In fact the culture history approach was an essential tool of the Nazi sponsored *Ahnenerbe*, the SS Ancestral Heritage Foundation from the early 1930s onwards (Arnold 1990).

Throughout the history of Archaeology in Germany the general approach to archaeology has been a methodological one rich in fieldwork, chronology and source criticism but low on theory and social context (Härke 1995). In the twentieth century this built upon the German positivist approach in the humanities. There was a strong emphasis upon the researcher as an observer of historical facts. After the Second World War this lack of theoretical discussions in archaeology was, to a certain extent, politically driven, particularly in East Germany, as archaeologists focused on data collection rather than theoretical debate to avoid engaging with the prescriptive political environment of the time.

While the New Archaeology was taking the English speaking archaeological world by storm in the 1960s, German archaeologists were not keen to engage with what they saw as an abrasive approach, dismissive of earlier achievements in the subject and with a distinctive bias for research undertaken in the English language. The role of tradition in German archaeology, even as recently as the 1990s (Härke 1995), has been evident in the very structure of the research institutions many of which have changed little since the nineteenth century, characterised by considerable autonomy for professors and a strong tradition of following in your professor's footsteps rather than challenging their ideas (as in the Anglo-Saxon school). This inheritance of ideas and research frameworks is also seen in France, Spain and Italy where the structure of academic institutions encourages the continuation of ideas and approaches through generations of scholars.

The focus on identification and discovery through field work and classification rather than interpretation and theory in post-war Germany has also been partly attributed to what Smolla has described as 'Kossinna syndrome' (Smolla 1980). That is a fear of over interpretation which has led to an extremely narrow definition of serious scholarship and a rejection of ideology, which ironically itself has now become an ideology.

While the influence of the German school on the interpretation of NBAs has been minimal, the isolated nature of the approach, and the fact the most NBAs in that part of the world were discovered or excavated in the second part of the twentieth century, has meant that limited comparisons have been made with NBAs elsewhere. The sites are described but as they are not fitted into any wider behavioural or cultural interpretation there is little need to present them to the wider world. As a result many of the sites are little published in languages other than German, which made it difficult to include them in this study. The isolation of much German research, and the lack of publications in languages other than German, has meant that it has been extremely difficult to find out much about the German NBA sites. Although there has been a general acceptance that an area north east of the Rhine lacks handaxes, this currently does not stand up to scrutiny. The density of sites is low and many either contain prepared core elements and/or have been dated to later phases of the Pleistocene outside the scope of this research, for example Markleeberg (Mania 1995; White 2000). Other sites reported to lack handaxes have small sized raw material which may have influenced assemblage character, some have handaxes manufactured on bone, for example Bilzingsleben (Mania 1991).

Again it is hard to imagine a Clactonian debate in Germany. Each site is described and recorded methodologically and a reluctance to engage in generalisations and theory building as a result of the 'Kossina Syndrome' means that there is little 'grand theory' for NBA research to challenge, unlike Britain.

The Soviet School

Although much of the area influenced by the Soviet school of thought lies outside the study area for this thesis the archaeology of those areas of central and eastern Europe that were formerly under Soviet rule were heavily influenced by this ideology. Archaeology was heavily funded by the state in the Communist Soviet Union which

Trigger described in 1989 as having 'the largest centralised network for archaeological research' (Trigger 1989: 207). Heavily influenced by Marxist thinking the emphasis in Soviet archaeology has been on a materialist understanding of the past. The distinctive character of Soviet archaeology has been emphasised by the political and ideological isolation experienced for much of the twentieth century and the language barrier that has prevented much research from being accessible to the wider international archaeological community. Perhaps more than any archaeological approach, Soviet archaeology has become entwined and consistently developed within a single philosophical tradition – Marxist materialism, rather than chopping and changing with shifts in a fluctuating political and philosophical climate.

Focus on material culture was the basis of the Soviet approach, along with a strong belief that societies were products of their pasts, and created themselves through their modes of production and material culture. This Marxist approach also emphasised the role of the ordinary people, something that was lacking from western archaeologies until much later on. Similarly the Marxist preoccupation with social change was found much earlier in the Soviet archaeological traditions than their western counterparts. Within Palaeolithic research, therefore, there was a strong focus upon lithic technology, in particular upon the function of the objects (e.g. Semenov 1964). However, curiously perhaps for an archaeology so focused on material culture, classification was somewhat neglected in the Soviet approach making inter-site comparisons more difficult. In fact Trigger reports that as late as 1989, there was still no single accepted classification for Palaeolithic artefacts in the USSR (Trigger 1989: 239). In central Europe the influence of this Soviet lack of classificatory system can be seen in the report on the site of Vértesszőlős (Kretzoi and Dobosi 1990) in which the lithic artefacts are analysed according to a singularly complex and convoluted system that bears little resemblance to that used elsewhere. In turn the use of such a unique system undoubtedly contributed to the reported uniqueness of the site itself in comparison to other Middle Pleistocene European sites. The absence of the obsession with classification which characterises the history of many western schools of archaeology meant that a debate about the status and interpretation of NBAs like the British Clactonian debate would not have taken place within the Soviet school.

Beyond the core – Palaeolithic archaeology in Spain, Portugal and Italy

Although study of the Palaeolithic in Spain dates back to the nineteenth century, modern Palaeolithic research is still at an early stage in many key areas. The first Palaeolithic discoveries were made at San Isidro, Madrid by De Prado, De Verneuil and Lartet before 1850. In the early twentieth century Obermaier, Perez de Barradas and Wernert developed the first systematic Palaeolithic study in the peninsula (Obermaier 1924; Querol and Martínez Díaz 1996). However, the Spanish Civil War and the subsequent nationalist regime of General Franco saw a lapse in research from which Spanish Palaeolithic studies has only recently begun to recover (Santonja and Perez-Gonzalez 1996). There is a strong tradition of French-style research in Spain – often by French researchers (e.g. Francois Bordes at El Aculadero in Southern Spain (Querol and Santonja 1983), and the Abbé Breuil at a number of locations including Minateda, Albacete (Breuil 1920)). This is particularly strong in the northern areas which contain many cave sites similar to those of southern France, many of which have equally spectacular parietal art. Indeed there are many wonderfully preserved long-sequence cave sites (e.g. el Castillo, Atapuerca), particularly in the north of Spain (Cantabria, Asturias, Cataluña), and these have tended to dominate research. Few of these cave sites however contain Lower Palaeolithic deposits (Santonja and Villa 1990), with the notable exception of Atapuerca (Carbonell *et al.* 2001), and there are also considerable areas of Spain which lack cave sites and have the sorts of fluvial, alluvial and colluvial archaeology more familiar to British Palaeolithic archaeologists which is only now beginning to be investigated (e.g. Perez-Gonzalez 2002).

The influence of French approaches to the Palaeolithic can be seen in the research at both Cova del Bolomor and El Aculadero, two key NBA sites looked at in this thesis. The problem encountered by researchers at both sites is that the assemblages do not fit into the Bordes typology which forms the basis of French analyses elsewhere. This has been addressed in both instances by the researchers employing an adapted version of the Bordes typology – usually with fewer types (Fernández Peris 2006; Querol and Santonja 1983). In fact Bordes himself is quoted in the publication for El Aculadero as saying that his typology is not easily applicable to this assemblage (Querol and Santonja 1983). Fernández Peris has undertaken an impressive study of the material from Cova del Bolomor (Fernández Peris 2006; Fernàndez Peris, Calatayud, and Martinez-Valle 2000, Fernández Peris, Guillem, and Martinez-Valle 1997). He has commented several times that the assemblage is unusual and difficult to interpret because of a lack of comparative sites (pers. comm.). Studies of both

Aculadero and Bolomor have shown a tendency to focus on retouched tools to inform analysis with, for example, 'Tayac points' being picked out as one of the characteristic features of the Cova del Bolomor assemblage (Fernández Peris pers. comm.). For such assemblages where current typologies do not seem the most suitable way to describe them I would argue it is more appropriate to consider technological aspects of the assemblages. Rather than focusing on the presence and absence of certain retouched tool types we might learn more by exploring the knapping strategies employed at the sites.

Again as with the French, Germans and Soviet Schools it is difficult to imagine a debate like the Clactonian debate taking place in Spain. The disruption of the development of archaeological theory, and the heavy influence from France mean that the conundrum of NBAs as seen in the UK would not emerge.

The situation in Portuguese Palaeolithic research is similar to that in Spain, although perhaps at an even greater linguistic disadvantage with few researchers beyond Portugal and Spain being able to read Portuguese. During the 1940s the Abbé Breuil and Zbyszewski undertook research into the Portuguese Palaeolithic bringing it to the attention of European researchers (Meireles 1986). As in Spain research was affected by the political situation in the second half of the twentieth century. Portuguese Palaeolithic sites are also problematic in that they consist largely of isolated surface find spots or sites that lack clear stratigraphic context. All these factors have helped to keep the Palaeolithic of this area, in particular the Lower Palaeolithic, little known and understood by researchers elsewhere. There are a number of interesting sites emerging in the Tagus valley (e.g. Raposo, Margarida Salvador, and Pereira 1996) and a number of littoral sites which have been known about for far longer (e.g. Breuil, Vaultier, and Zbyszewski 1942), however, the lack of publication and problems with dating and contextual understanding have made it difficult to include these sites in any study.

Early Palaeolithic research in Italy, like the majority of early Palaeolithic research everywhere, closely followed developments in France. Research into quaternary geology and archaeology began in Italy in the second half of the eighteenth century with, as elsewhere, a significant number of the discoveries being made by amateurs as well as 'professional' researchers. The earliest research focused on Middle and Upper Palaeolithic sites such as the caves of Balzi Rossi (Palma di Cesnola 1996). 1875 saw the first creation of a chair in palaeoethnology in Rome, occupied by L. Pigorini for forty years, and, at the end of the same year, the creation of the Rome Museum of Prehistory and Ethnography (which today bears Pigorini's name). At the same time the Italian Bulletin of Palaeoethnology was founded in Parma (Palma di Cesnola 1996). As the titles of the chair and museum suggest, from the outset the Italian school considered comparisons with ethnography an indispensable part of prehistoric research.

Whereas in France at the end of the 19th /beginning of the 20th century there was a strong emphasis on a single, linear evolution, in Italy this approach was strongly refuted in favour of a more multi-linear evolution which argued for the existence of many parallel and independent cultures. In fact Italian archaeology has a strong culture-history approach that persists today. The origin of this cultural emphasis could be linked to the strong role that the Catholic church has traditionally played in Italian society and its influence on scientific research. In the late nineteenth, and even the earlier twentieth century, there was a certain reluctance to engage with Darwinian evolutionary theory (Groenen 1994), particularly with regard to human beings. Focusing on the cultural identities of the stone tool assemblages from the distant Italian past took the focus away from the sometimes controversial ideas of evolution and went some way to humanise this early antediluvian past, much as the French Philosopher and palaeontologist Teilhard de Chardin went on to argue in the first half of the twentieth century (Teilhard de Chardin 1955).

In contrast to this 'Roman' school, an opposing school was set up in Florence, at the beginning of the twentieth century, with an approach inspired by natural history. The focus of this Florentine school was the reconstruction of the palaeo-environment, aiming to correlate the Italian cultures with those already known of elsewhere in Western Europe. However this school focused very much on the context of the archaeological discoveries rather than the interpretation of the assemblages themselves. Systematic fieldwork in Italy came a little later than elsewhere in Europe - it was not until 1914 that the first modern Palaeolithic excavations were undertaken at the cave of Romanelli by G. A. Blanc, who then went on to undertake excavations in virtually every corner of Italy covering all the Palaeolithic periods (Palma di Cesnola 1996).

The principal aim of Palaeolithic research in Italy has been the identification of different cultural groups and the understanding of their evolution in time and space, often at the expense of more functional and techno-typological approaches (Palma di Cesnola 1996). As a result most the variations in the Palaeolithic record are attributed to cultural factors and, perhaps more than any other area of Europe, Italian archaeologists have embraced the idea of the Clactonian (For examples see Bietti and Castorina 1992; Mussi 1995, 2001; Palma di Cesnola 1996).

Undoubtedly the lack of handaxes at some Middle Pleistocene sites, for example Monte Poggiolo and La Polledrara, can be explained by a lack of suitable raw material (the majority of pebbles used are these sites are only 10mm in length), however, Bietti and Castorina's 1992 paper summarises the history of assigning cultural labels to these assemblages and challenges many of the assumptions (Bietti and Castorina 1992). More recent publications however still refer to Clactonian, Tayacian and even Clacto-Tayacian assemblages (Palma di Cesnola 1996). In addition, the widespread absence of handaxes has been taken to indicate an extremely early date for these assemblages and chronological problems have certainly clouded the Middle Pleistocene NBA picture. All these factors have contributed to a rather confusing picture of the Middle Pleistocene in Italy. However, ongoing research at sites such as Isernia la Pineta (e.g. Coltorti *et al.* 2005) is beginning to clarify this and Italy certainly looks to be an interesting area for future research into Middle Pleistocene assemblage variability.

The British debate has influenced the work of a number of researchers in Italy (e.g. Bietti and Castorina 1992), however the general and long standing acceptance of cultural explanations for variation in the Palaeolithic record in Italy has meant that the debate has not taken off with the same vigour as that in Britain and has largely followed rather than led this NBA debate.

Conclusion: the Clactonian a very British problem

In my opinion the differences in the approaches to studying NBAs support the argument that one of the major drawbacks in the advancement of the debate about the Clactonian has been Anglo-Saxon parochialism.

One key area, perhaps *the* key area, for Palaeolithic research is the question of typology. It provides the basis of all comparative investigation, describing the lithic data that are so fundamental to Palaeolithic research. As ever increasing and diverse sites are found, traditional typological methods are being stretched to the limit. The best known, the typology of Francois Bordes, is increasingly falling out of favour outside its French heartland as it is found to be inapplicable to many of the industries found beyond the Middle and Lower Palaeolithic of central France (Ashton *et al.* 1994; Ashton and McNabb 1992; Monnier and Molines 1993; Querol and Santonja 1983; Santonja *et al.* 2000; Villa 1983), something Bordes himself acknowledged (see above). He reinvented his typology to sort the simpler forms (Querol and Santonja 1983). However, while the applicability of Bordes' typology to many sites is widely questioned there is yet to be, and perhaps unlikely to be, a widely accepted alternative. Eudald Carbonell has attempted to introduce such an alternative (Carbonell *et al.* 1999) but this is not widely used beyond those trained by him and is therefore largely restricted to areas of Spain. Consequently, this lack of typological consensus and appropriateness makes inter-site/inter-regional/inter-national comparisons very difficult short of returning to the collections themselves, which, apart from being time-consuming and not always practical, is sometimes prevented by senior researchers restricting access. I would argue that the lack of a common typological 'Esperanto' has encouraged the use of particular artefacts as a sort of short-hand, in effect as the type fossils we are so often at pains to state we have left behind in the early twentieth century: for example Acheulean sites have handaxes, Middle Palaeolithic sites Levallois/PCT and so on.

As regards NBAs in Middle Pleistocene Europe the issues raised in the above discussion have a number of implications:

- Firstly, the typological discrepancies are potentially a serious problem. This is particularly the case for research into NBAs where a lack of key type fossils (as above) leaves a vacuum that an absence of otherwise commonly agreed understandings of tools cannot fill. This problem of typology is exacerbated by the differences in approach taken by researchers in addressing this gap – Vértesszőlős was noted as a good example of this.
- Secondly, the traditional approach of researchers in different countries to Palaeolithic archaeology varies considerably, not just at the typological level but at the interpretational level. This has affected the way in which the relationship

between assemblage variation and change is perceived, presented and interpreted.

- Thirdly, there are huge variations in the types of sites that have been preserved from the Middle Pleistocene period in different geographical areas. In many instances this has led to biases in the significance attached to the NBA assemblages and has resulted in some inappropriate or misleading comparisons, exacerbated by a lack of typological consensus.
- Finally there are differences in the chronological, geological and climatological understanding of the Middle Pleistocene context of the assemblages in different geographical areas which have serious implications for intra-continental comparisons of data sets.

Another new approach?

The discussions concerning the Clactonian have been ongoing for nearly a century now and in many ways the issues under debate are the same as ever: how can it be characterised, and how does it fit into our wider understanding of Middle Pleistocene lithics and hominin behaviour? The history of the Clactonian has been one of shifting definitions, names and interpretations that fit with the current views of technological development and poor inter-researcher communication at the international level. In many ways these debates have not got us any further in understanding the significance or 'meaning' of the archaeological data itself. As archaeologists our principal interest is in trying to *understand* the behaviours of the people who made and used the artefacts we find rather than simply *describing* the artefacts themselves. Of course the two are not mutually exclusive but in order to progress from the relative stalemate of the British Clactonian debate we must look further afield and put the Clactonian within its wider European context, and then understand that context more fully.

The Palaeolithic has often been described as the one truly global archaeological period, and it is true that Palaeolithic archaeologists, perhaps more than their colleagues, do tend to take a geographically and temporally broader view, albeit often through necessity rather than choice. Given the relative scarcity of sites in the UK that can contribute to the NBA debate, the fluctuating (indeed debated) nature of Britain's island status (see White and Schreve 2000), and given the technological uniformity of

European Middle Pleistocene assemblages that is so often reported, it seems a logical step to look to the continent to increase our understanding of not just the British Middle Pleistocene NBAs but more importantly the behaviour of the Middle Pleistocene hominins themselves.

The layout of the thesis

The comparative analysis and presentation of such dispersed and historically disparate assemblages has proved challenging. Although the variability of Palaeolithic assemblages cannot be expected to respect modern political boundaries, as this chapter explored, their interpretation often has. For this reason the results of this study are grouped in chapters according to modern geography, rather than thematically as might be expected.

Chapter 1 has explored how national identities, philosophies and politics have influenced the presentation, interpretation and even the discovery of Palaeolithic assemblages, and how this has been a particular problem for NBAs. By presenting the results and analysis in terms of geo-political areas I am able to address up front the peculiarities of research in that particular region and make some attempt to tease out raw data with which a comparative study can be undertaken. A thematic approach would have required much greater repetition and resulted in less clarity of the data.

One of the principal aims of this study was to undertake comparative research to better understand the variability observed in the Middle Pleistocene Non-Biface Assemblages (NBA) recorded in western Europe. In particular this study looks at the extent and nature of European Non-Biface Assemblages with particular reference to British Clactonian assemblages. As highlighted here, in the past these assemblages have been interpreted and re-examined in isolation from Middle Pleistocene assemblages elsewhere in Europe. It is the intention of this thesis to reassess the British Middle Pleistocene Non-Biface Assemblages, the Clactonian, by investigating them within a broader geographical and temporal context. The following chapter details the methodology applied to achieve this.

The key questions the thesis seeks to address are:
Are there any non-biface assemblages elsewhere in Middle Pleistocene Europe?

How similar or dissimilar are these assemblages to the Clactonian British assemblages and to eachother?
What light can a broader pan-European perspective shed on the Clactonian?

The analysis starts with the British Clactonian, as it is from this that the British interest in Non-Biface Assemblages arises, and indeed my own as a British researcher. The subsequent chapters explore the NBAs of other European regions, with each assemblage assessed in comparison to the British Clactonian, and to each other. Through this the character of the Clactonian is illuminated and placed in a wider context, and pan-European patterns in Non-Biface Assemblages are identified and explored.

Chapter Two

Methodology

This chapter sets out the approach taken in this thesis to the analysis of the sites, their data and their interpretation.

Criteria for site identification

Initially a literature review was undertaken and a gazetteer of European Middle Pleistocene NBAs was produced of all sites described as lacking handaxes within the study area (see appendix 2). Sites were then selected from this which were deemed suitable for comparative study on the basis of chronology, assemblage size, geography, historical reference, accessibility and context.

Chronology

While sites throughout the Middle Pleistocene (780ka to 125ka) were considered, it is principally the middle part of the Middle Pleistocene that is of interest here. The British Clactonian sites are currently dated to MIS 11 and possibly MIS 9 (see Chapter Three). In order to undertake a comparison of pene-contemporaneous NBAs, sites which are reported to date to the period between MIS13 and MIS9 (approximately 500ka to 300ka) were included in this study. However, in many instances dating of the assemblages is no more precise than 'Middle Pleistocene'; such sites were generally not selected for more detailed analysis, although they have been included in the gazetteer which is included as an appendix at the end of this thesis.

Assemblage size

McNabb has suggested that only assemblages with greater than 500 artefacts could be considered to be genuine NBAs (Clactonian in his case; McNabb 2007). Initially the same cut off point was used as a criterion for sites selected for detailed study, however, there were a number of factors that led to a revision of this criteria. Firstly, several of the key sites identified from literature review were found to have smaller assemblages than reported, such as the lowest level of La Micoque. Secondly, in some instances, such as the lower levels of Cova del Bolomor, Menez Dregan and some of the emerging Polish sites, the assemblages were only one or two hundred in size as only a small area had been excavated. I considered it important to include both the historical NBAs and these potentially significant emerging NBA sites; therefore, an exception was made where either there was considerable historical reference to the NBA nature of a site or where recent discoveries had the potential to produce much larger assemblages.

Geography

Although principally focusing on western Europe, it was felt important to take into account assemblages from the possible 'Clactonian homeland' of Central Europe, and in particular the understudied but often arm-chair re-interpreted assemblage from Vértesszőlős. Therefore an area of Europe was included to the west of a line from the eastern edge of the Baltic to the Aegean.

Historical reference

The historical interpretation of the sites was also taken into account. As well as investigating some recently identified NBA sites (e.g. Cova del Bolomor, Spain and Menez Dregan, France), I wanted to include some of the sites that have been traditionally referred to by researchers in the Clactonian debate in the UK (e.g. Clacton-on-Sea, Essex and Swanscombe, Kent) and discussions of other NBAs in Europe (e.g. Vértesszőlős, Hungary and La Micoque, France). A key observation to emerge from my research is the role that the national historical context has played in the identification, presentation and interpretation of NBA sites, as outlined in the previous chapter. My analysis of some of those key sites historically associated with the debate on Middle Pleistocene assemblage variability, alongside fresh discoveries, has enabled a reflective and historically contextualised comparison of European NBAs.

Accessibility

Another important criterion was the accessibility of the assemblages – both physically in terms of the access to collections and linguistically in terms of publications. A good working knowledge of French and Spanish, improved in the course of the research, meant that reading reports and arranging museum visits was not a problem. However, a very limited knowledge of German meant that studying the assemblages in this area, the majority of which have only been published in German would have been impossible within the time frame of the thesis. There were also a number of assemblages for which access was sought but could not be obtained.

Context

Finally, I also wanted to include a range of site types - that is both cave (e.g. Cova del Bolomor and Caune de l'Arago) and open air sites (e.g. Les Tares and Vértesszőlős).

This would enable the possibility that some of the variations observed could be attributed to variations in the setting and type of site to be explored.

Sites identified

Over 120 NBA sites have been identified (see gazetteer): sites that are *reported* as dating to the middle part of the Middle Pleistocene, lacking in handaxes and lacking in Levallois (i.e. they are not NBAs or Mousterian/Middle Palaeolithic sites). What is clear from the gazetteer is that the majority of these assemblages are very small, some consisting of only single finds. Therefore, one of the first criteria employed when identifying suitable sites for the purpose of this study was the assemblage size (see above). As McNabb (*ibid*) has pointed out many Middle Pleistocene assemblages in Britain come from secondary contexts, often river terrace deposits that have been derived from much larger areas. As a result these assemblages are both temporally and spatially averaged and therefore can be considered to be representative of hominin behaviours through time over a wide area. Consequently, the larger the assemblage the larger the sample of these behaviours and the more representative the assemblage can be considered to be. To a certain extent the cut off point of 500 artefacts is arbitrary, however, as a criterion that has been applied to define Clactonian assemblages it was applied to the assemblages studied in detail in this thesis. Nevertheless, given that on closer inspection a number of assemblages fell short of this number the criteria was adjusted with assemblages of over one hundred being included (e.g. Bolomor lower levels) to enable comparisons to be made.

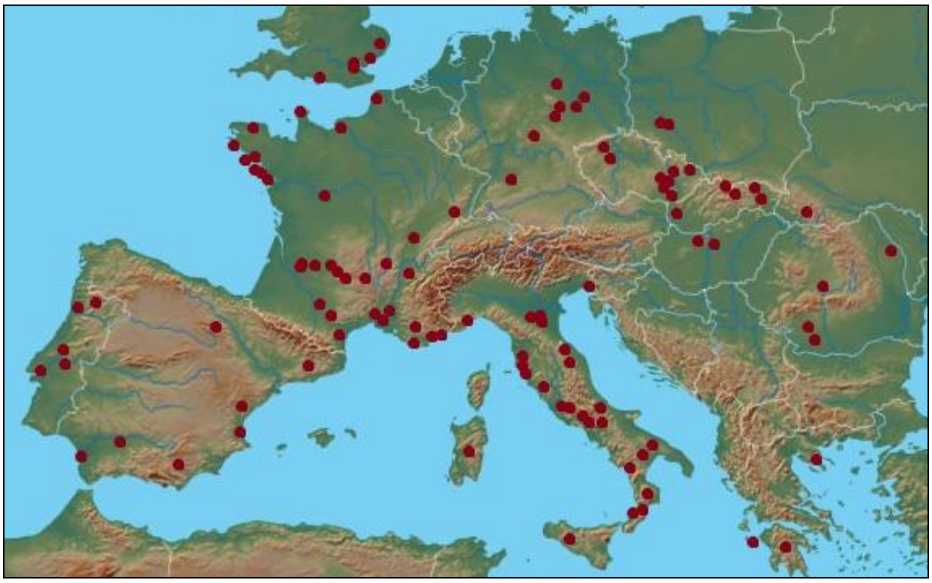

Figure 2.1: Map showing location all the NBAs identified in the gazetteer

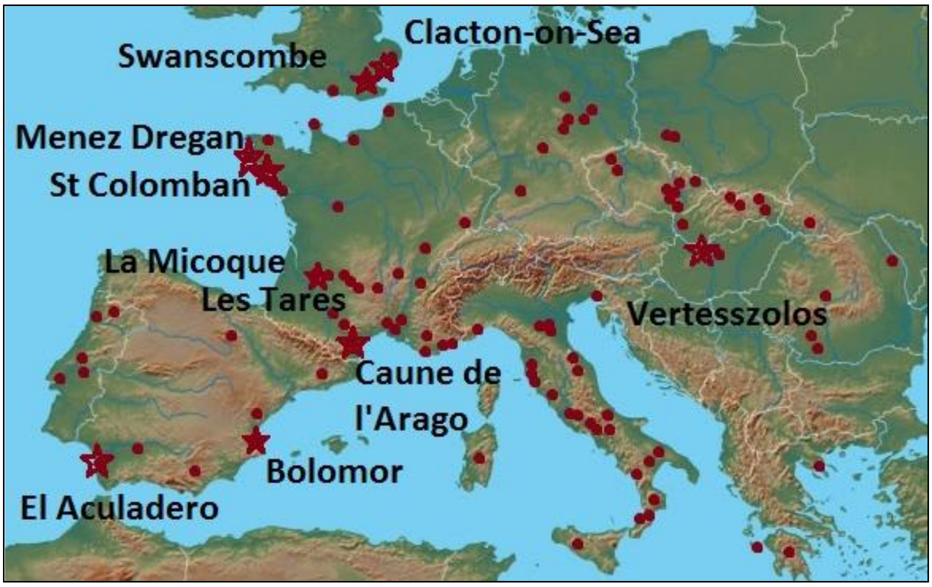

Figure 2.2: Map showing European sites selected for detailed study

Methodology for the Collection of data

This section sets out the typology employed in collecting the data from the assemblages. The methodology set out here is principally that employed in the first hand analysis of assemblages, however, as explained above a number of the assemblages included in the study could only be studied through published data. In those instances certain adaptations were made to enable comparison with my data. Where this has occurred explanation is given in the relevant sections.

Analysis in the absence of type fossils

One element that consistently emerged from the literature review for this research was the variety of typologies that had been employed for the analysis of these sites. Almost every site has its own typology, often invented especially for that site, e.g. Vertésszőlős (Kretzoi and Dobosi 1990), Aculadero (Querol and Santonja 1983), Menez Dregan (Molines 1996) and Cova del Bolomor (Fernández Peris 2007). While this illustrates the unique nature of many NBAs and the unsuitability of many existing methodologies for dealing with them, it also creates many problems when attempting a comparative study.

The wide range of raw materials involved and considerable differences in artefact size have also posed a challenge. There was always a risk that addressing these challenges by adding additional categories and criteria would result in an unwieldy typology. Therefore, I decided early on that rather than adding additional complexities I would simplify wherever possible; thus, the methodology used is a very basic, technological and typological approach. The aim of this is to compare the way in which the hominins were working the stone rather than focusing on the retouched tools as the apparent 'end products'. Although there will always be problems of subjectivity in the use and creation of typologies and methodologies, the simplicity of the approach used here tries to move away from the pitfalls of judging the 'intention' behind the knapping of the hominins.

Flaked pieces are distinguished from detached pieces but terms such as chopping tool and chopper are not used except when citing descriptions employed by authors for published assemblages. While these flaked pieces are described as different core types (Non-prepared, prepared etc) it is not intended that use of the term 'core' implies that the pieces were only used in this way. Similarly with retouched pieces the presence of retouch is noted and described very generally, principally in terms of edge alteration, rather than using a simplified version of Bordes typology as many other authors do (e.g. Molines 1999; Querol and Santonja 1983). Another major consideration for the methodology was that it be compatible with the methodology already used by McNabb to gather data for the analysis of the majority of the British Clactonian sites. Therefore the methodology used is largely based on McNabb (2007), however, certain adjustments had to be made to incorporate some of the variability observed in the Europeans NBAs studied. Rather than add new categories as assemblages were assessed some categories were merged from the McNabb 2007 typology on which this approach was based.

Typology used for the study

The recording methodology used is detailed here with each measurement explained under its appropriate heading. As noted above this is a pared down typology so as to enable comparison between assemblages without getting distracted by typological intricacies for sites that display very little standardization.

Basic type

This category defines the piece as:

- Unretouched hard-hammer flake (both whole and broken)
- Prepared core technology flake – these were identified by the presence of dorsal scar patterning consistent with a prepared core. Sometimes but not always accompanied by butt preparation. Very few prepared core flakes were

identified, probably as the absence of prepared core technology was one of the criteria used to select the assemblages (see Figure 2.3 for an example of a possible prepared core flake from Vértesszőlős).

- Thinning flake - those flakes produced during thinning of bifaces. These again were virtually absent as assemblages reported as lacking bifaces had been selected for the study.
- Retouched tool – this category included flaked flakes and pieces with clear evidence of use damage.
- Non-prepared core with no fixed perimeter – this category includes all cores which display no evidence of prepared core technology and where they have been flaked either at a number of different edges, or where one edge has been exploited but around no more than 50% of the circumference.
- Non-prepared core with fixed perimeter – these cores display no evidence of prepared core technology, however they have been knapped around a fixed perimeter for more than 50% of the circumference (see figure 2.4).
- Prepared core – these are cores which display some evidence of prepared core technology, such as Levallois. These were largely absent from the assemblages studies as a lack of prepared core technology was one of the criteria employed in selecting assemblages.
- Biface – this category includes artefacts which might be described as proto-bifaces and rough outs. The artefacts have displayed bifacial working and thinning.
- Debris – this category includes all chips, chunks and core fragments. In the majority of instances these artefacts have few characteristics that in isolation makes then clearly anthropic. Initially all flakes less than 20mm were included in this category, however, given the small size of the artefacts in many of the assemblages studied this was revised and only flakes less than 10mm were included. Chips are flakes and fragments less than 10mm, Chunks are pieces without scars but which could have been produced during knapping. Core fragments are pieces of cores with clear flake scars.
- Hammerstone - it is acknowledged that distinguishing hammerstones from natural artefacts that have suffered damage is not easy and this category was only assigned to artefacts where there was a clear concentrated area of impact damage consistent with use as a hammerstone (e.g. see figure 2.5).

- Modified natural – this category was used to record ambiguous hammerstones and material that the excavators believed had been brought to the site by hominins. This category was not used in analysis but in some instances was used as an indication of raw material size.

Very Basic Type

The aim of this category was to provide a basic unit of analysis for comparing assemblage composition at the most basic level. However, when it came to comparing the assemblages which I studied first hand and those which were only accessible through the literature I had to further simplify this category. A category of 'very basic type' was created which simply defined artefacts as:

- Flake – to include all flakes (the first three categories above), whether whole or broken.
- Flaked piece –this category included all cores and bifaces. To avoid value judgement as to whether these items are tools or cores the term flaked piece was used.
- Retouched – this category included all retouched tools as above.
- Debris – this included all pieces classified as debris above.

It was found that this simpler basic categorisation enabled fair comparison of assemblages which could only be studied from the literature.

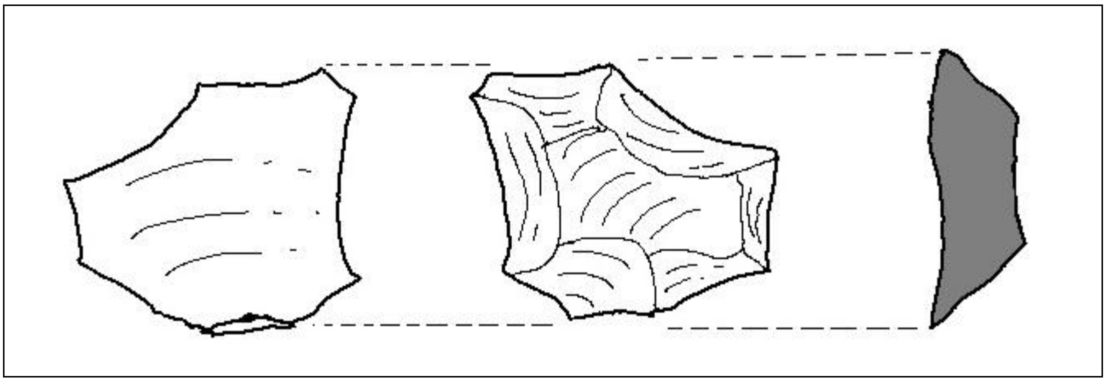

Figure 2.3. Possible prepared core flake from Vértesszőlős I, Hungary. (scale 1:2. Drawing H. Fluck)

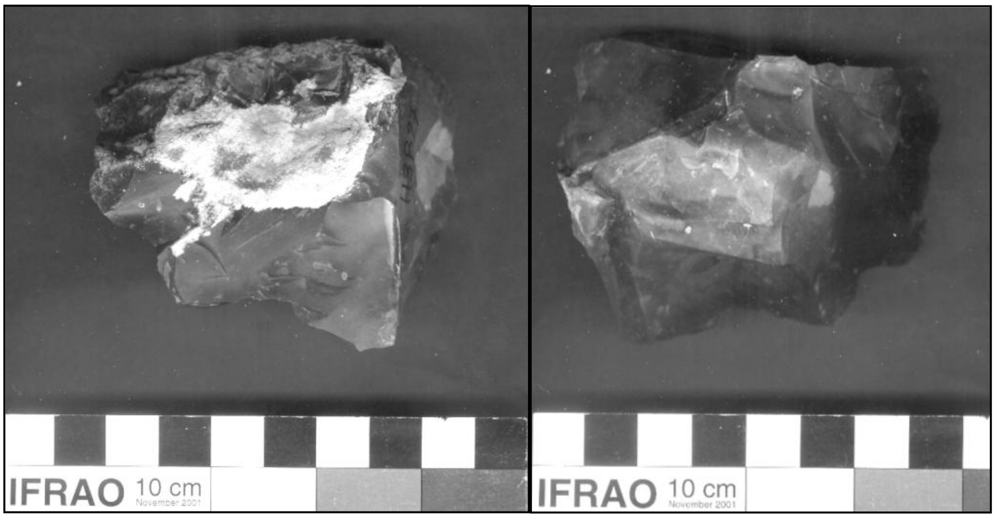

Figure 2.4. Flaked piece. Non-prepared core with fixed perimeter (note alternate flaking around more than 50% of the perimeter) from Les Tares, France. (Photo H. Fluck).

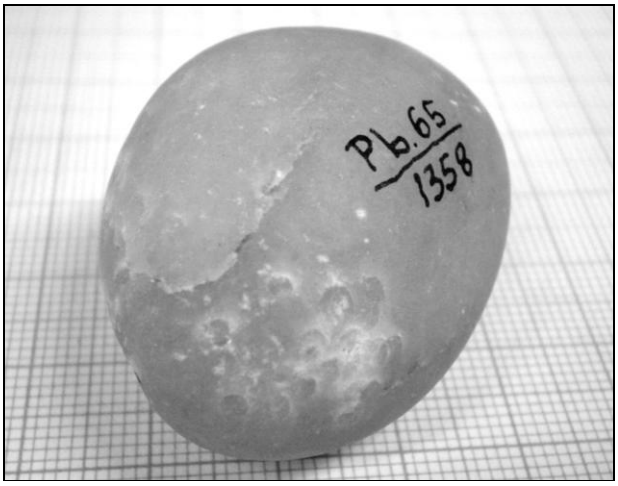

Figure 2.5. Possible quartzite hammerstone from Vértesszőlős I, Hungary. Note concentrated area of incipient cones. (Photo H. Fluck)

Broken

This category simply describes whether or not the piece is broken, whatever type it is. No distinction is made between types of break.

Flaking type

This describes the flaking technique used on both non-prepared cores and prepared cores:

- 'single removals' - these are not necessarily just one scar per core but where the removals have been the result of isolated and unrelated actions (see figure 2.6).

- ‘alternate flaking’ - where the piece is turned and the scar from the last removal forms the knapping surface for the subsequent removal (see figure 2.7). This category includes ‘simple alternate’, ‘classic alternate’ and ‘complex alternate’ flaking strategies as defined by Ashton and McNabb for the analysis of the cores at Swanscombe (Ashton and McNabb 1996: 245).
- ‘parallel flaking’ - where the removals are all parallel to each other from the same flaking surface. This includes both ‘single episode’ and ‘multiple episodes’ of parallel flaking (see figure 2.8).
- ‘alternate and parallel flaking’ - a combination of parallel and alternate flaking (see figure 2.9).
- ‘Mixed techniques’ - a mixture of techniques. This was most commonly a combination of single removals and alternate flaking (see figure 2.10)
- ‘other non-prepared core technology’- knapping techniques which do not fall into the previous categories.

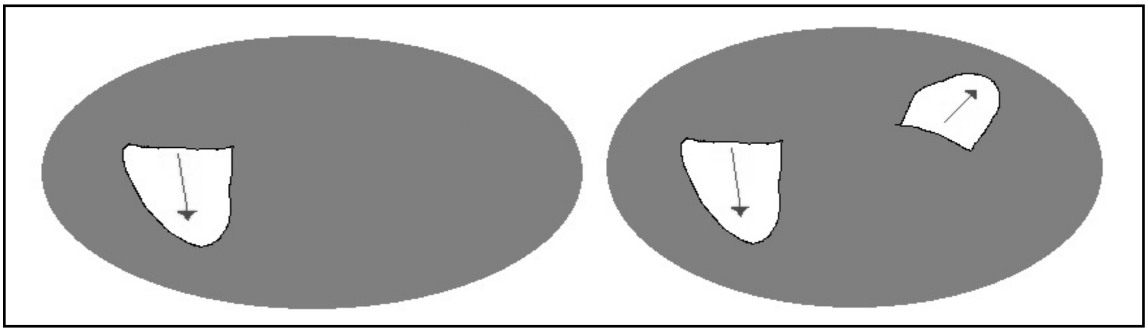

Figure 2.6. Single removals. (drawing H. Fluck)

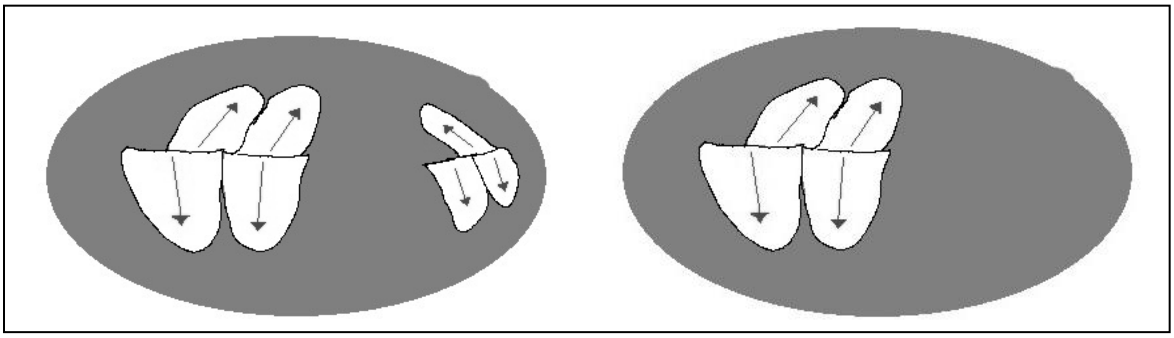

Figure 2.7. Alternate flaking (drawing H. Fluck)

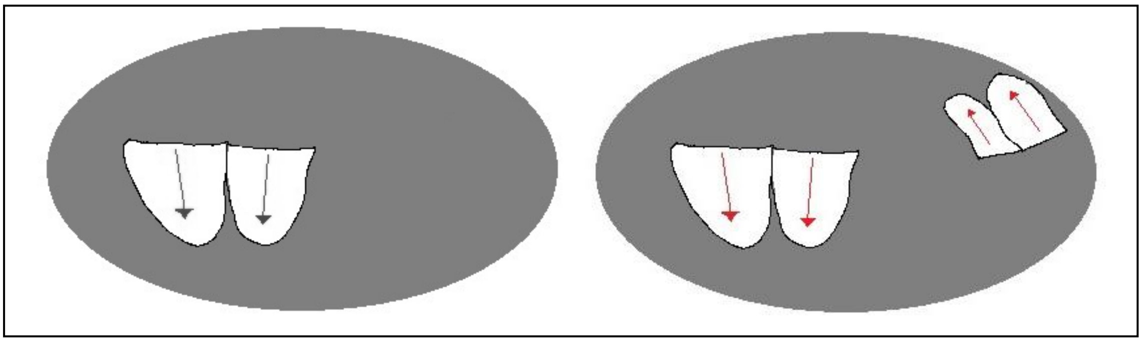

Figure 2.8. Parallel flaking (drawing H. Fluck)

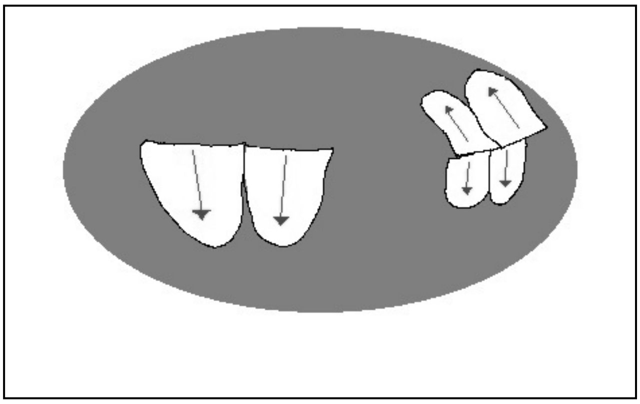

Figure 2.9. Alternate and parallel flaking drawing H. Fluck)

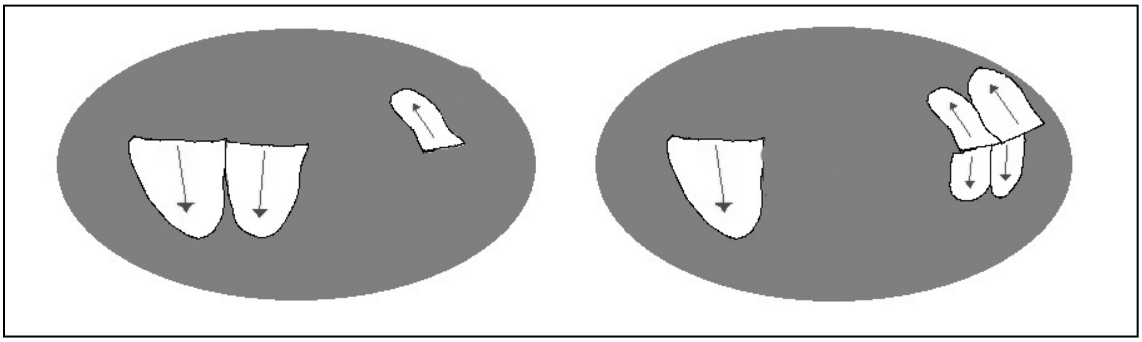

Figure2.10. Mixed techniques. On the left parallel flaking and single removals; on the right alternate flaking and single removals. This illustration is just the two most commonly encountered examples. (drawing H. Fluck)

For prepared cores the cores would be described as convergent, parallel or centripetal flaking. However, very few prepared cores were identified in the assemblages studied. This undoubtedly reflected the fact the definition of NBAs used in this study included an absence of prepared core technology as well as bifaces.

The flaking strategies were compared between assemblages and groups of assemblages as well as within assemblages for different raw materials. The result enabled an assessment as to whether there was evidence for hominins varying their flaking strategy between raw materials within individual NBAs, or between NBAs.

Number of scars

This counts the number of flake scars identifiable on either the flaked pieces or the dorsal of the flakes. The number of flake scars was used as one indicator of the intensity of raw material exploitation.

Raw material

This identifies the type of raw material used as either:

- Flint or flint-like
- Limestone
- Quartz
- Quartzite
- Gres (indurated sandstone)
- Other

At some sites it was necessary to adapt the terminology where a greater range of raw material was used. For example at Vértesszőlős (see figure 2.11), the term flint was used to describe any fine grained raw material (which was mostly radiolarite). At Vértesszőlős this category was augmented by a further category identifying the fine red radiolarite as opposed to other 'flint-like' raw materials. This was done as it became apparent that the red radiolarite was potentially not obtained from the local gravels but from an alternative local source.

Comparisons were made between the knapping strategies applied to different raw materials, and tool types produced.

The particular detail of raw materials for each site are discussed in more detail within succeeding chapters.

Figure 2.11. Raw material variability from Vértesszőlős I (photo H. Fluck).

Condition

This describes the condition of the piece as mint, slightly rolled, very rolled, desilicified or other damage. All of these are based upon assessment by the naked eye. The criteria for distinguishing these are as follows:

- Mint – artefacts in mint condition had sharp unrounded edges and ridges and displayed no signs of desilicification or rolling (see 2.12).
- Slightly rolled - artefacts where the ridges and edges display slight damage, slight rounding or bashing, but where the features of the artefact are still visible (see 2.13).
- Very rolled – artefacts where the ridges and edges have suffered extensive rounding and bashing making all but the most obvious features difficult to discern (see figure 2.14).
- Desilicified – artefacts which have undergone some degree of desilicification. Typically this is observable in a whitening of the material and considerable loss of density, in severe cases this was accompanied by a friability that made analysis problematic. This was particularly common in assemblages from Cova del Bolomor (see figure 2.15).
- Other damage – This included all other types of damage, including fire damage (see figure 2.16).

Figure 2.12. A mint condition flaked-flake from Les Tares, France (photo H. Fluck).

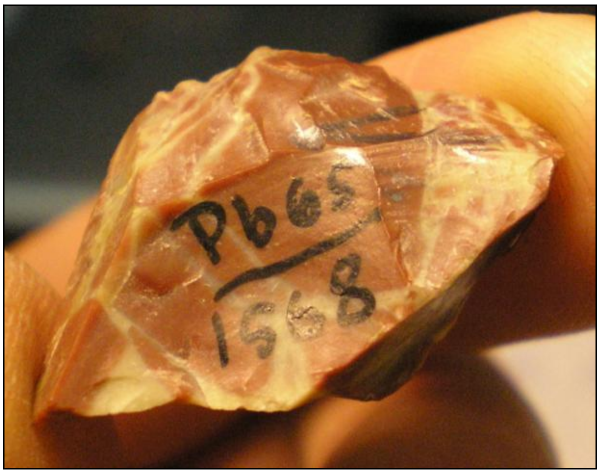

Figure 2.13. A slightly rolled core from Vértesszőlős I, Hungary (photo H. Fluck).

Figure 2.14. A very rolled core from Menez Dregan I, France (photo H. Fluck).

Figure 2.15. Left - Example of badly desilicified artefact from Cova del Bolomor, Spain. Right – edge damage resulting from desilicification on a scraper from Cova del Bolomor, Spain (photos H. Fluck).

Figure 2.16. A fire damaged flake from Vértesszőlős, Hungary (photo H. Fluck).

Butt type

This category describes the type of striking platform identified for the unbroken flakes as:

- Plain – the most frequent type. The striking platform for the flake has not undergone any preparation and the flake has been struck from either a previous flake scar or a cortical surface.
- Dihedral/facetted – flakes in this category were struck from a platform that consisted of two or more flake scars
- Marginal – flakes in this category were struck from a platform which was barely discernable. This is most commonly seen on thinning flakes where the flake is struck from the edge of the artefact.
- Shattered – this is where the butt has shattered when it was struck.

- Prepared – this was only used where there had been clear preparation of the butt. There is some potential overlap with the 'dihedral/facetted' category. Very few flakes were identified within this category as the assemblages had been selected based on an absence of prepared core technology.

The analysis of the butts was used to inform an understanding of the flaking strategies employed. In fact the simplicity of the flaking strategy at most of the sites was reflected in extremely high percentages of plain butts.

Retouched type

This category describes the type of retouch on pieces that show some degree of additional alteration, whether cores, flakes or fragments. The retouch is defined as:

- Denticulate – a denticulated edge or scraper, includes pieces with more than two consecutive notches. Only artefacts displaying a clearly jagged edge were included in this category (see figure 2.17).
- Side scraper – retouch along one side of a flake (see figure 2.18).
  End scraper – retouch along the distal edge of a flake. For simplicity, particularly to aid with the analysis of published data the two scraper categories were merged into a simple 'scraper' category.
- Flaked-flakes or flaked-flake spalls – includes Clactonian notches and Kombewa flakes/cores (struck from the ventral of the flake – the Kombewa flakes have two ventral surfaces) (see figure 2.19).
- Retouched notches – notches showing further retouch
- Convergent retouch – two convergent retouched edges. This includes points (see figure 2.20).
- Non-diagnostic retouch – pieces that are retouched but not diagnostic (i.e. do not fall into any other category)
- Multiple tools – pieces that display two or more distinct zones of retouch.
- Utilised flakes – unretouched flakes that show edge damage from use
- Bifaces – classic bifaces with a roughly ovoid shape, soft hammer thinned, with a continuous sinuous edge.
- Rough outs – biface rough outs (see figure 2.21)
- Atypical bifaces – bifacially flaked or shaped pieces with some thinning that are not classic bifaces. This includes those artefacts sometimes described as proto-bifaces.

This category was kept deliberately simple to enable comparison to be made between different raw materials and quite different assemblages.

Figure 2.17. Denticulate on a flake from Vértesszőlős I, Hungary (photo H. Fluck).

Figure 2.18. Scraper (side scraper) from Les Tares, France (photo H. Fluck).

Figure 2.19. Flaked-flake from Les Tares, France (photo H. Fluck)

Figure 2.20. Convergent retouch on a quartzite flake from Vértesszőlős I, Hungary (photo H. Fluck).

Figure 2.21. Unexpected biface rough out from Menez Dregan I level 4 (photo H. Fluck)

Dimensions

Both the flake or axial dimensions (length, width and thickness) and maximum dimensions (length, width and thickness) of the pieces were recorded (see figure 2.22). However, throughout this thesis the dimensions referred to are the maximum dimensions unless otherwise specified. This was used to enable comparison between flakes, flaked pieces and raw material size.

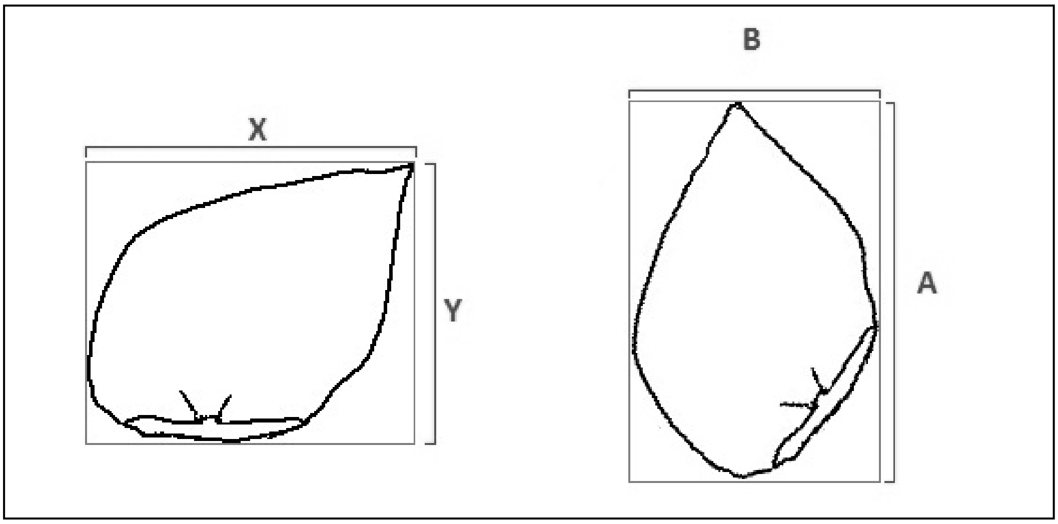

Figure 2.22. Left – flake dimensions where Y=flake length and X=flake width. Right – Maximum dimensions where A=maximum length and B=Maximum width. (drawing H. Fluck)

Toth type

The Toth types (Toth 1985) were used as a way of recording the amount and location of the cortex and the stages of the *chaine operatoire* for unbroken flakes (see figure 2.23).

- Type 1 is an entirely cortical flake.
- Type 2 has some cortex on the dorsal and on the butt.
- Type 3 has some cortex on the butt but none on the dorsal.
- Type 4 has an entirely cortical dorsal but none on the butt.
- Type 5 has cortex on the dorsal but none on the butt.
- Type 6 has no cortex on either butt or dorsal surface.

Type 1 is a flake from the primary stage of flaking, a flake that is either the result of a single removal or the first flake in a knapping sequence. Types 2, 3 and 4 are flakes from early in the knapping with either cortical butts or dorsal surfaces. Type 5 is a flake from later in the knapping sequence and these flakes are typically the most frequent in a sequence of knapping. Type 6 flakes are from the final stages of knapping. A high incidence of Type 6 flakes could be expected in a number of different scenarios:

1) When large raw material is being knapped intensively. In this instance once cortical and partially cortical flakes had been knapped there would be a greater

volume of material for which no cortex would be present than that for which cortex would be present.

2) When material is brought to a site already partially knapped. In this instance there would be fewer partially cortical flakes resulting from the subsequent knapping as the majority would have been removed elsewhere.

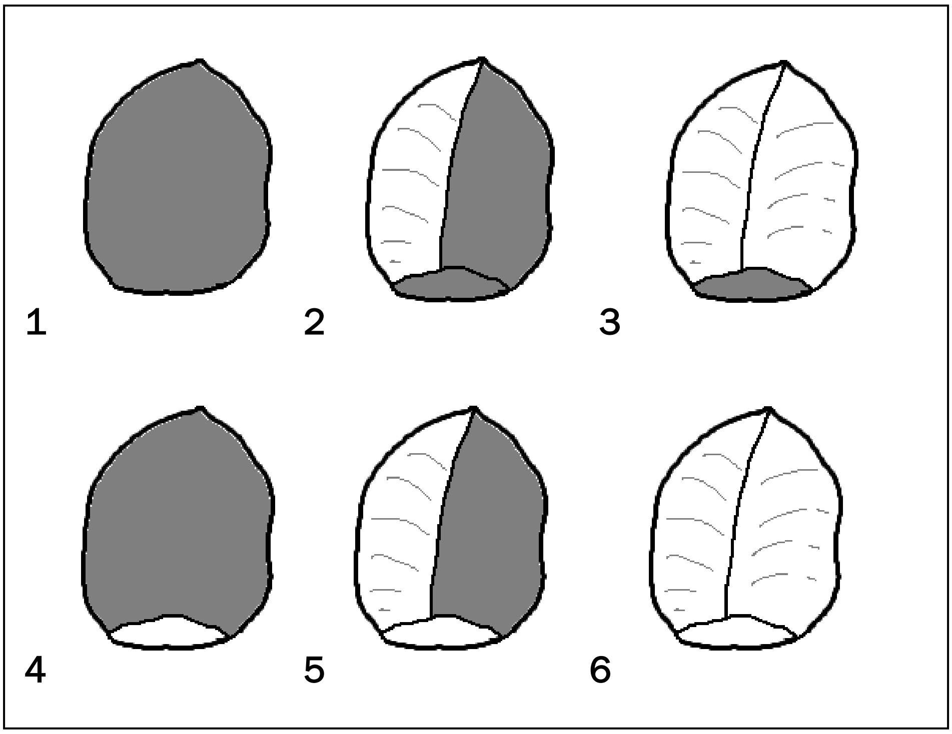

Figure 2.23. Flake Toth types (drawing by H. Fluck)

Cortex present/absent

Whether or not cortex is present was recorded for all artefact types. Although this was reflected in the Toth type a simpler ‘presence/absence’ category aided comparison between artefacts with and without cortex.

Chapter Three

The British Clactonian

This chapter presents the empirical characteristics of the British Lower Palaeolithic lithic assemblages which have been described as Clactonian based upon my reassessment of the key assemblages using the methodology outlined in the previous chapter; the data are a combination of data gathered by me, as well as personal observations of all the key lithic assemblages and unpublished data from McNabb where I was unable to gather data in person. The data for Barnfield Pit, Rickson's Pit and Clacton are my own. While I acknowledge the controversies surrounding the definition and interpretation of the Clactonian (e.g. see Ashton and McNabb 1994; McNabb 1992, 1996, 2007; Ohel 1977, 1979; Wenban-Smith 1998; Wenban-Smith *et al.* 2006; White 2000), which have been outlined in the first chapter, I will not dwell on these here. The purpose of this thesis will be to look further afield to inform our broader understanding of Clactonian, so I will reserve detailed interpretation until we have considered the European evidence. I will, however, explore the key British sites, presenting the data and describing the assemblages, before setting out a description of the characteristics of the Clactonian against which comparisons can be made with assemblages further afield.

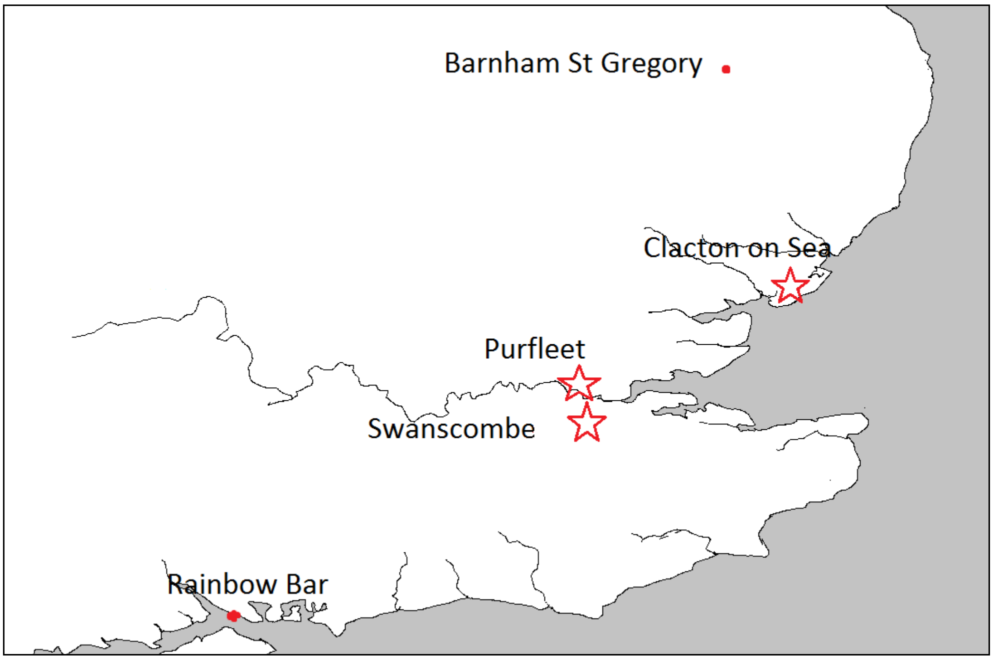

Figure 3.1: Map showing the location of sites described in the text. (Starred sites are NBAs).

Clacton-on-Sea, Essex

Clacton-on Sea is located some 80km northeast of London on the Essex coast. Famously the type site for the Clactonian, it is not a single site but rather a series of localities spread over 3km, which have yielded archaeological, faunal and palaeoenvironmental data. The sites stretch from Clacton-on-Sea itself southwest to Jaywick Sands and Lion Point (see figure 3.2). The deposits in which the artefacts were found were set down by the ancestral Paleo-Thames (the modern day Thames can be found 50km to the south) during a warm, fully temperate pollen sub-stage (HoIIb) within MIS 11, and can be considered to be broadly contemporary at the various localities (Bridgland *et al.* 1999).

History of Research at Clacton-on-Sea

19th century – Geological observations of deposits at Clacton.

1911-20s – Warren undertakes systematic section observation and artefact collection, primarily at West Cliff and Lion Point. He identifies a series of five buried channels between the two localities and correlates freshwater gravels visible at West Cliff and Lion Point

1934 – Oakley & Leakey excavate at Jaywick Sands: seven test pits and a series of boreholes identify a series of higher loams, overlying variegated loams (Estuarine Bed), overlying marls and sands (Upper Freshwater Bed), overlying reddish gravel (Lower Freshwater Bed). They recover rolled artefacts from the channel deposits (Oakley and Leakey 1937).

1951 – Warren publishes definitive Clactonian paper based on Lion Point collection.

1953 – Pike and Goodwin publish the first pollen diagram for the British Middle Pleistocene based on boreholes from West Cliff. This dates the deposits to the Hoxnian interglacial: Estuarine Beds to Late Temperate Pollen Zone III; Lower Freshwater Beds to Pollen Zone IIb.

1969-70 – Wymer and Singer excavate at the Golf Course. The sequence excavated: sandy gravel (Lower Freshwater Bed), overlain by marl (Upper Freshwater Bed), overlain by a localised patch of gravel. Artefacts and bones were found in both gravel layers and at the top of the marl.

1987 – Pre-development excavations at Butlins Holiday Camp (Bridgland *et al.* 1999). The resulting analysis of environmental data confirms an MIS 11, probably soon after the Anglian glacial, date for the channel deposits (*ibid.*).

Text Box 3.1. Research at Clacton-on-Sea.

Figure 3.2: Map showing the distribution of the Clacton localities (drawing H. Fluck).

The deposits from all these localities consist of a series of marls (sands and clay), and gravels indicative of alternating estuarine and freshwater depositional environments (see figure 3.3). In particular the long sedimentary sequence at West Cliff has yielded particularly significant palaeoenvironmental remains which have played an important role in understanding and dating the Clacton sequence (e.g. see Pike and Goodwin 1953). The results of these studies indicate that the artefacts are associated with a warm climatic phase with freshwater conditions. The Upper and Lower Freshwater Beds at West Cliff have been correlated with the outcrop of gravel and marl deposits below the modern beach at Lion Point, the most southerly site identified to date. The Butlins Holiday Camp locality lies between West Cliff and Lion Point and relates to the southern side of the channel deposits identified at the other two sites (see figure 3.4). The Golf Course site, slightly further to the southwest and excavated at the end of the 1960s, remains the only location in Clacton-on-Sea that has *in situ* archaeological remains. It consists of a sandy gravel overlain by a marl which represent the Lower and Upper Freshwater beds respectively; overlying the marl was another patch of gravel also containing lithic artefacts and fauna. The artefacts from the upper part of the lower gravel and lower part of the marl were extremely fresh, but there were other more rolled artefacts distributed throughout the gravel. This led the excavators to suggest that the fresh artefacts represent a disturbed primary context site.

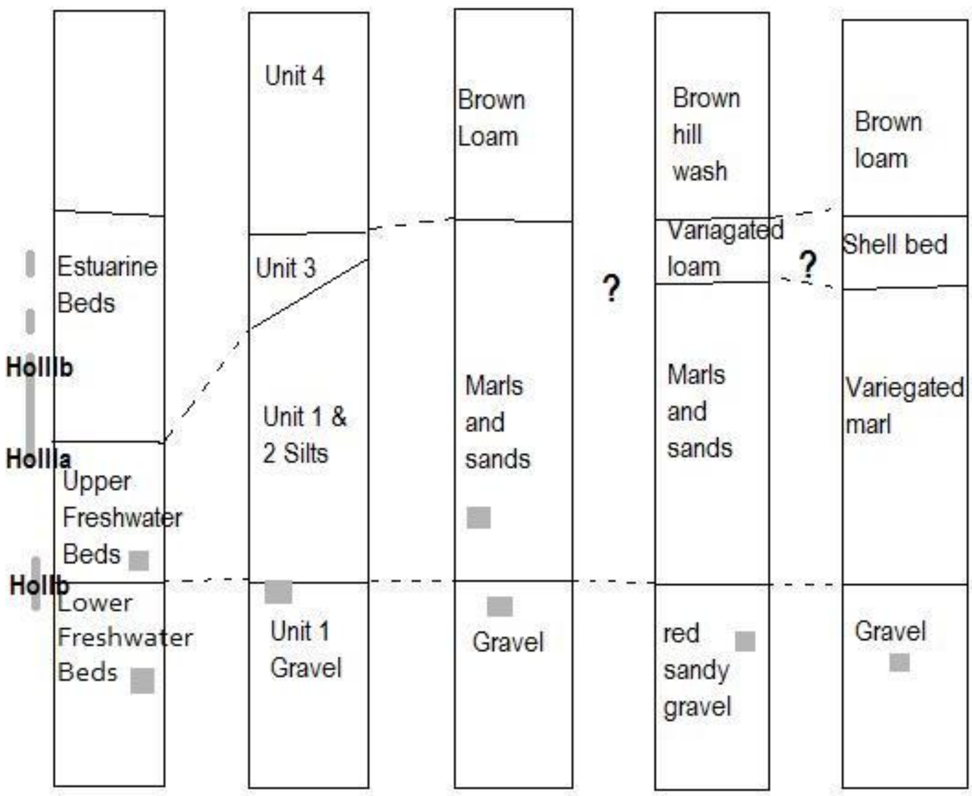

Figure 3.3 – schematic stratigraphic sequence at Clacton-on-Sea. From left to right: West Cliff, Butlins, Golf Course, Jaywick, Lion Point. Grey squares denote artefacts. Pollen sequence from borehole shown on the left. (after McNabb 2007)

The Artefacts

The assemblages from the different Clacton localities are extremely similar, adding credence to the interpretation that they are contemporaneous. Generally the proportion of flaked pieces is low – typically making up around 10% of the assemblage (see table 3.1). However, an interesting exception to this is Warren's collection from Lion Point for which flaked pieces make up over 37% of the assemblage (flakes make up c. 48%); this may explain why he was so insistent that the Clactonian was a core-based industry, despite claims by Breuil and others that it was its flakes which were so characteristic. However, the fact the material is largely collected is also certainly a factor – flaked pieces being easier to spot and identify in the dark sticky mud of the organic beds undoubtedly biased the collection in their favour. In fact overall flakes and flake tools do dominate the Clacton assemblages, making up between 64% and 88% of the assemblages.

	Jaywick Sands 1934		Lion Point 1934		Lion Point Warren		Golf Course Gravel		Golf Course Marl		Golf Course Gravel above Marl		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Flaked pieces	22	12.1	2	11.8	230	37.2	84	7.8	23	10.8	4	19	**365**	**17.15**
Non classic biface	0	0	0	0	0	0	1	0.1	0	0	0	0	**1**	**0.05**
Flakes (incl. broken)	149	81.9	15	88.2	299	48.3	804	74.9	137	64.3	16	76.2	**1420**	**66.8**
Retouched tools	10	5.5	0	0	82	13.2	88	8.2	14	6.6	1	4.8	**195**	**9.2**
Debris	1	0.5	0	0	6	1	95	8.8	39	18.3	0	0	**141**	**6.6**
Hammer stones & modified natural	0	0	0	0	2	0.3	2	0.2	0	0	0	0	**4**	**0.2**
TOTAL	**182**	**100**	**17**	**100**	**619**	**100**	**1074**	**100**	**213**	**100**	**21**	**100**	**2126**	**100**

Table 3.1: Artefact types from the various Clacton localities

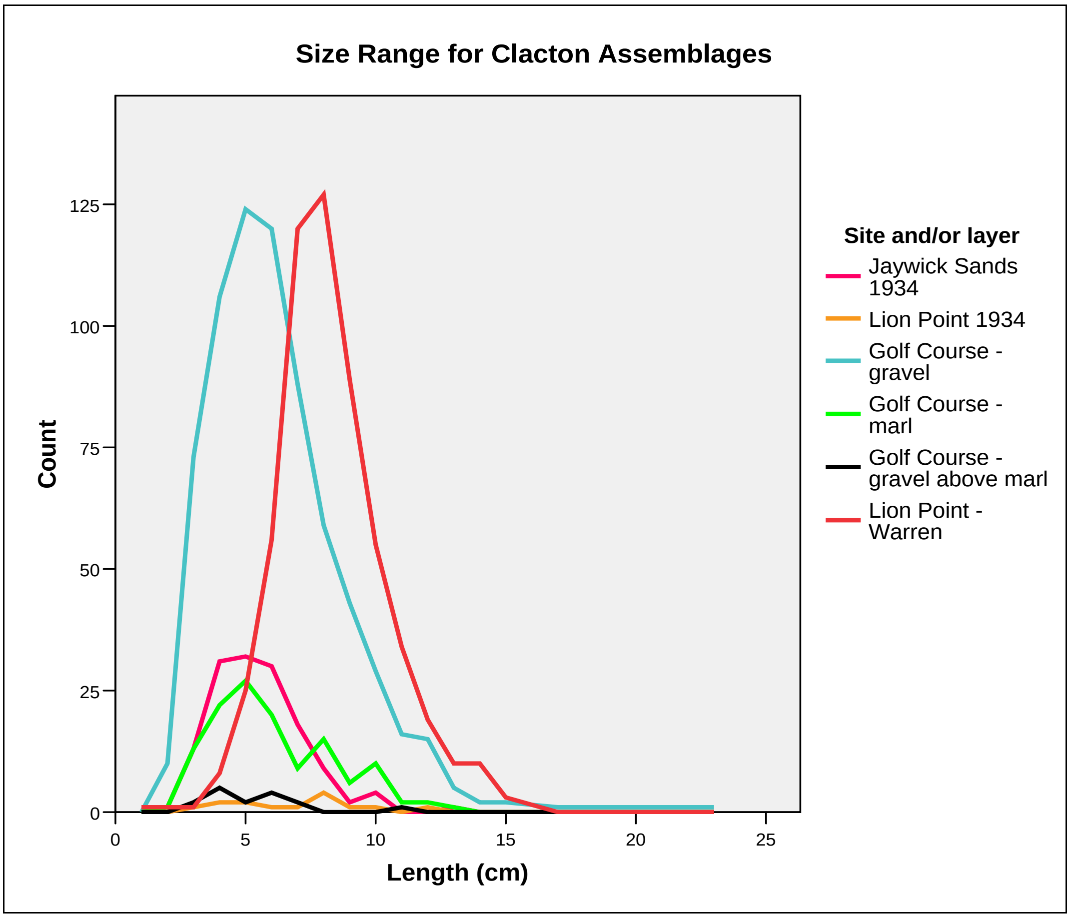

Figure 3.4: Size distribution for Clacton assemblages

The majority of the artefacts for all the Clatonian localities are between five and ten centimetres long, with occasional larger artefacts (mostly flaked pieces) but with very few smaller. While this undoubtedly in part reflects the derived and disturbed nature of the assemblages, the size and intensity of flaking (e.g. see figure 3.5) would seem to suggest that the knappers were routinely producing, and one must assume using, medium to large flakes and cores. On the whole the number of flake scars is low on both cores and flakes (see figure 3.5) and consistent with low intensity flaking which prioritised the production of medium/large, simple, hard hammer flakes.

		Length (mm)
Flaked pieces	***Mean***	**87.9**
	Count	366
	Max	223
	Min	10
	Range	213
	Standard Deviation	24.3
Flakes	***Mean***	**56.0**
	Count	1420
	Max	147
	Min	13
	Range	134
	Standard Deviation	21.4
Retouched tools	***Mean***	**63.8**
	Count	195
	Max	115
	Min	16
	Range	99
	Standard Deviation	17.9

Table 3.2: Length of artefact types in mm.

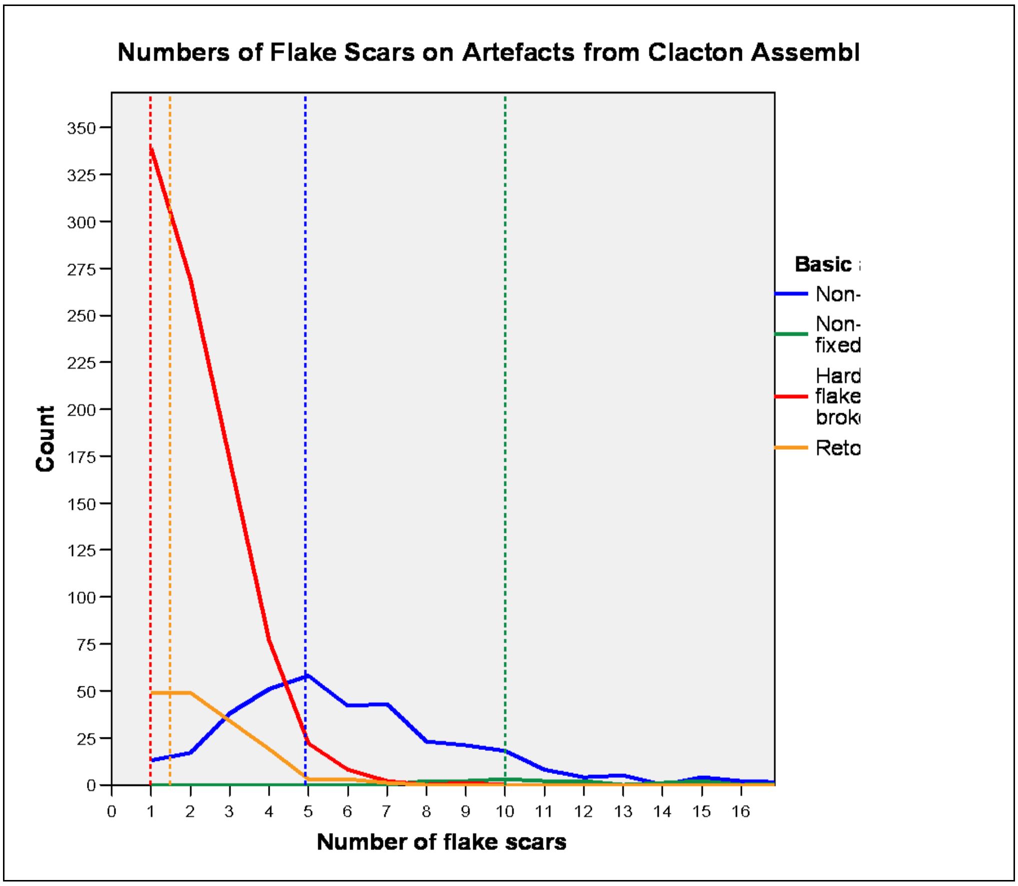

Figure 3.5: Graph showing the number of flake scars on artefacts from all the Clacton localities. NB. dotted lines denote modal averages.

The flaking strategy applied to the flint is simple. The knapped pieces are dominated by non-PCT cores, the vast majority of which are without a fixed perimeter, and Levallois and discoidal techniques are completely absent (see figure 3.6). There is a single atypical biface from the golf course gravel (see table 3.1) which in the past has been made much of by certain authors (e.g. Ashton and McNabb 1994; McNabb 1992, 1996). However, the absence of true bifaces, and any elements associated with their production is notable and a key characteristic of these assemblages.

	Toth 1	Toth 2	Toth 3	Toth 4	Toth 5	Toth 6	N
Quartz	16.8%	18.4%	8.9%	9.8%	30.8%	15.2%	315
Quartzite	15.7%	15.7%	12.6%	8%	30.2%	8.4%	427
TOTAL	16.2%	22.2%	11.1%	8.8%	30.5%	11.3%	742

Table 3.3 Data from McNabb and Kuman (In Prep) from the knapping of 60 quartz and 63 quartzite nodules mean length 128mm(quartz) and 97mm (quartzite)

The flaking strategy observed on the flaked pieces is dominated by alternate flaking with roughly 50% of all flaked pieces having been knapped in this way (see table 3.2). If we take into account the fact that the majority of those artefacts in the mixed technique category display a combination of alternate flaking and single removals we see that alternate knapping dominates being observed on c. 80% of the flaked pieces.

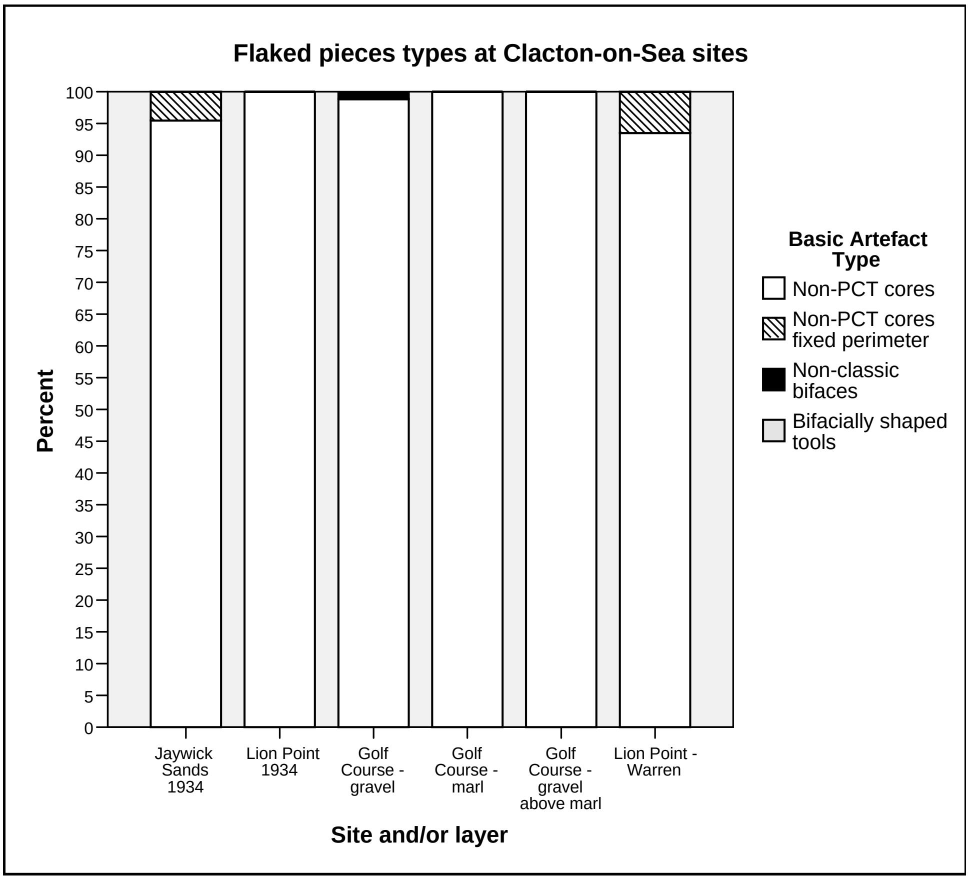

Figure 3.6: percentages of types of flaked pieces from the Clacton assemblages

	Jaywick Sands 1934		Lion Point 1934		Lion Point Warren		Golf Course Gravel		Golf Course Marl		Golf Course Gravel above Marl		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Alternate Flaking	11	52.4	-	-	128	56.9	27	41.5	7	53.8	-	-	173	53.4
Alternate & Parallel	0	0	-	-	18	8	4	6.2	1	7.7	-	-	23	7.1
Parallel Flaking	0	0	-	-	19	8.4	7	10.8	0	0	-	-	26	8
Single removals	3	14.3	-	-	4	1.8	10	15.4	2	15.4	-	-	19	5.9
Mixed techniques	6	28.6	-	-	44	19.6	14	21.5	3	23.1	-	-	67	20.7
Other non PCT	1	4.8	-	-	4	1.8	3	4.6	0	0	-	-	8	2.5
Centrepetal alternate	0	0	-	-	8	3.6	0	0	0	0	-	-	8	2.5
Other Fixed perimeter	0	0	-	-	0	0	0	0	0	0	-	-	0	0
	21	100	-	-	225	100	65	100	13	100	-	-	324	100

Table 3.4: flaking strategies observed for Clacton assemblages

While many of the smaller elements associated with *in situ* knapping may be missing due to the derived and disturbed nature of the assemblages, the flakes display a Toth-type distribution consistent with the complete knapping of nodules at or very near these localities. Experimental knapping by McNabb and Kuman (in prep., see table 3.3) has shown that for *in situ* knapping of quartzite and quartz nodules the largest proportion of the flakes are Toth type 5. The possibility of *in situ* knapping at the Golf Course Marl site is strengthened by the presence of refitted material (Keeley 1980; Wymer 1985). However the artefacts are distributed through the gravel and Marl indicating that the site is not undisturbed. The material from within the gravel has been reworked from a wider area of unknown extent but it does appear that this averaged assemblage is representative of complete knapping sequences.

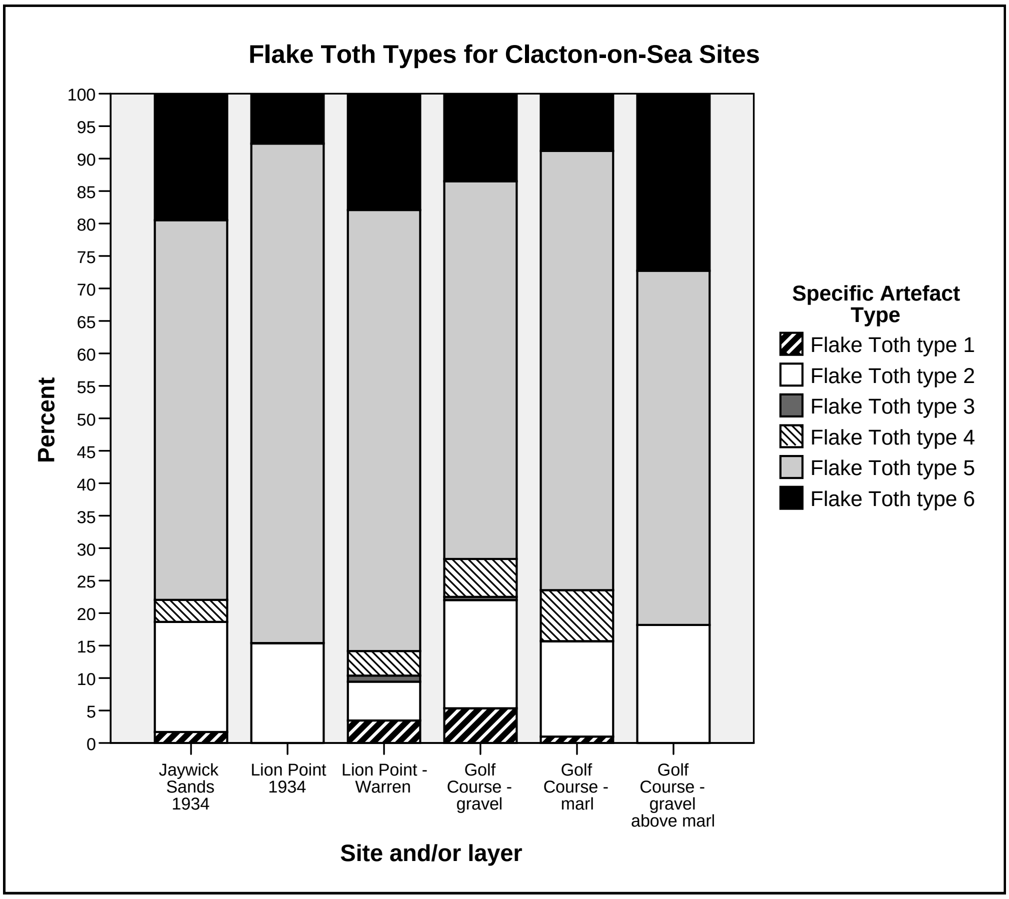

Figure 3.7: Graph showing percentages of flake Toth types for Clacton assemblages.

The retouched tools make up a small percentage of the assemblages, and the vast majority of these are flaked flakes or flaked flake spalls. The retouched tools show little standardisation with non-diagnostic retouched and multiple retouched pieces making up much of the remainder of the tools. Points and convergent retouch are absent but there are occasional scrapers, denticulates and retouched notches.

	Jaywick Sands 1934		Lion Point 1934		Lion Point Warren		Golf Course Gravel		Golf Course Marl		Golf Course Gravel above Marl		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Scraper	2	20	-	-	2	2.5	1	1.1	0	0	0	0	5	2.6
End scraper	0	0	-	-	6	7.6	2	2.3	0	0	0	0	8	4.1
Denticulate	0	0	-	-	6	7.6	1	1.1	0	0	0	0	7	3.6
Retouched notch	0	0	-	-	2	2.5	5	5.7	1	7.1	0	0	8	4.1
Point	0	0	-	-	0	0	0	0	0	0	0	0	0	0
Non-diagnostic	1	10	-	-	5	6.3	10	11.4	4	28.6	1	100	23	11.8
Multiple	1	10	-	-	5	6.3	8	9.1	3	21.4	0	0	17	8.7
Wedge	0	0	-	-	0	0	1	1.1	0	0	0	0	1	0.5
Flaked flake & spall	6	60	-	-	56	70.9	57	64.8	6	42.9	0	0	125	64.1
Utilised	0	0	-	-	0	0	3	3.4	0	0	0	0	3	1.5
Total	10	100	-	-	82	100	88	100	14	100	1	100	195	100

Table 3.5: Retouched tool types from Clacton assemblages

Overall the assemblages consist of simple, alternately-flaked cores and flakes in secondary and disturbed contexts which can therefore be considered to represent activity over a wider riverside environment, and probably over considerable time. If we accept the correlation between the Lion Point and Golf Course Gravel, and there is little reason to doubt it, then these deposits can be considered to represent a single Minimum Archaeological Stratigraphic Unit (after Stern 1993). Therefore the assemblages from these localities must be considered to represent a single, indivisible assemblage, albeit spatially and temporally averaged. The Golf Course Marl assemblage clearly represents a zone of subsequent activity, and the Gravel above the Marl may either represent reworking of this material or the reworking an additional phase of activity on the former bank of the river as suggested by Singer and Wymer (1973). Therefore there are at least two, and possibly three, chronologically distinct episodes (although of unknown duration) of the production of non-biface assemblages at Clacton-on-Sea.

Overall the assemblage from the Clacton-on-Sea localities could be summarised as showing hominin activity around freshwater channels with at least two chronologically distinct NBA episodes represented by both re-deposited material and a disturbed primary context site. The full knapping sequence is present indicating that knapping occurred on site and the knapping is dominated by alternately flaked non-prepared cores which produced simple medium to large flakes. There are very few retouched tools and the retouched component is dominated by flaked-flakes; handaxes, or evidence of their manufacture, are absent.

Swanscombe, Kent

As at Clacton-on-Sea, rather than being a single site Swanscombe consists of a number of localities (see figure 3.8), although unlike Clacton these have largely been identified through quarrying. The two principal localities are Barnfield Pit and Rickson's Pit (it was at Barnfield Pit that the famous Swanscombe skull was discovered in the 1930s), although more recently other sites have been excavated in the vicinity, such as the Swan Valley School Site, and the Elephant site at Southfleet. As with Clacton-on-Sea, the deposits at Swanscombe were laid down by a Pleistocene Thames and its tributaries, and the sites comprise a deep depositional sequence of alternating loams and gravels (see figure 3.10); it is within the Lower Gravel and Lower Loam that the Clactonian assemblages were found at the base of the sequence. The Acheulean assemblages were recovered from the higher levels, the Upper and Lower Middle Gravels, the Upper Sand and Upper Loam. Palaeoenvironmental analysis has suggested that the Lower Gravel and Lower Loam at Swanscombe are broadly contemporary with the Lower and Upper Freshwater beds at Clacton; that is, they date to a warm and temperate phase within MIS 11.

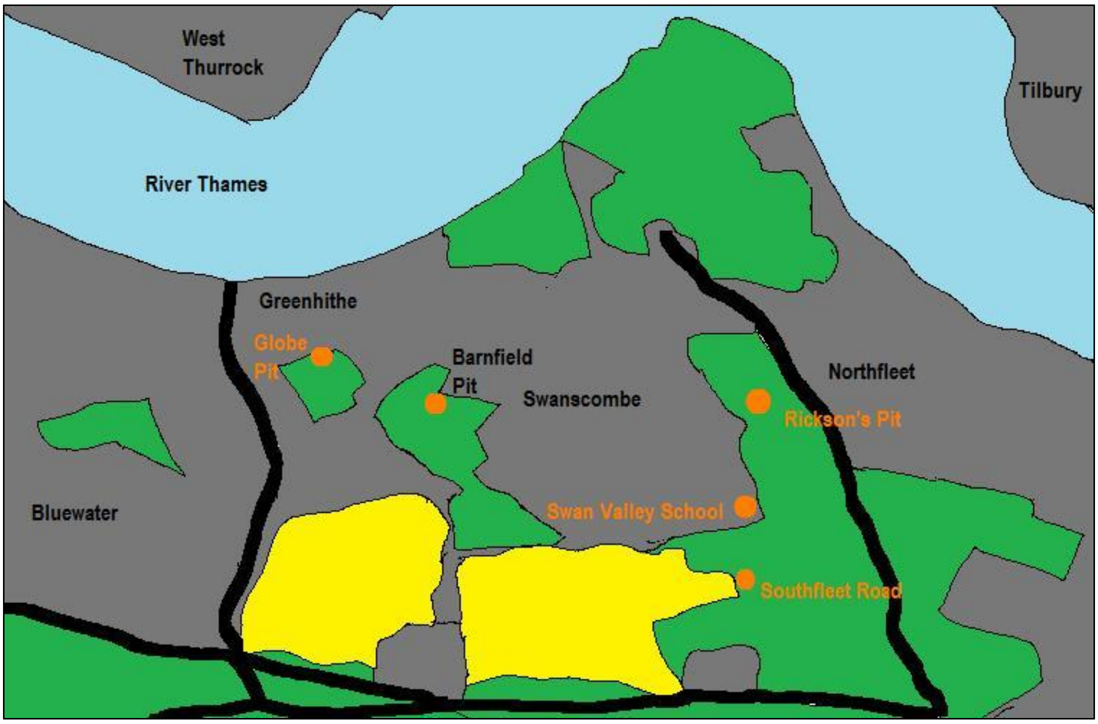

Figure 3.8: Map showing location of key Swanscombe sites.

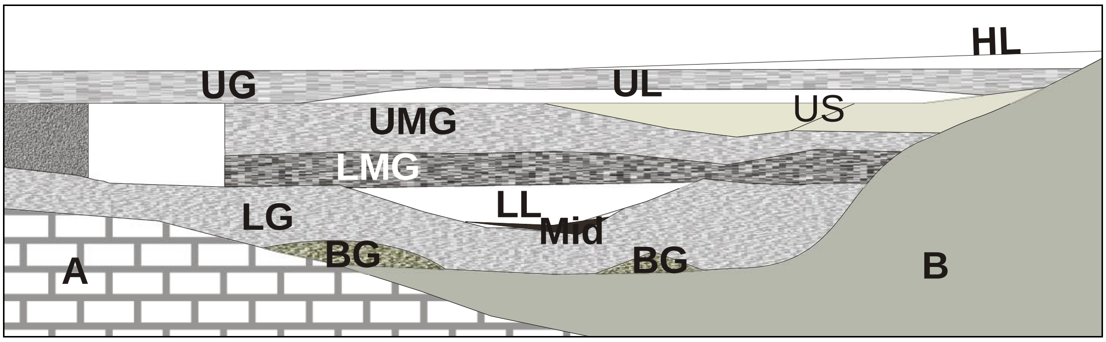

Figure 3.9: simplified stratigraphic sequence for Swanscombe localities: A - Chalk and coombe rock; B - Thanet Sand; BG – basal gravel; LG – Lower gravel; Mid-Midden deposit; LL – Lower loam; LMG – Lower middle gravel; UMG – Upper Middle Gravel; US –Upper Sand; UL – Upper Loam; UG – Upper gravel; HL – Higher Loam. (modified and redrawn after Conway 1996).

Barnfield Pit

Within Barnfield Pit the majority of the artefacts have been recovered from secondary contexts within channel deposits, however one area, known as the Lower Loam Knapping Floor, yielded extremely fresh flakes which are believed to be the *in situ*, although winnowed, result of a short knapping episode. The Lower Gravel deposits at Barnfield Pit have also yielded the only classic biface to have been found in a 'Clactonian' context: the infamous black ovate which was excavated by Marston from the base of the Lower Gravels. There are also some biface thinning flakes from the base of the Lower Gravels, along with some non-classic handaxes (McNabb 2007). These rare handaxe finds have been made much of in the past by certain authors (e.g. Ashton and McNabb 1994; McNabb 1992, 1996); however, more recent work by McNabb has played down the significance of these artefacts (McNabb 2007). Given the reworked nature of the deposits in which these artefacts were recovered I think we can place too much weight on these discoveries. The overwhelming majority of the assemblage is completely non-bifacial, in contrast with the overlying Middle Gravel Acheulean assemblage.

The lithics consist of flaked pieces, flakes and simple retouched tools. The favoured knapping technique seen on the flaked pieces was alternate flaking. The retouched tools display little standardisation with simple scrapers and flaked flakes dominating the assemblage (see table 3.9).

History of research at Swanscombe

1912 - Barnfield Pit is investigated by Smith and Dewey following a visit to the site by the Geologists' Association. Correlating stratigraphy across the site they note that the Lower Gravel contains a number of flakes and few cores, while the Lower Loam is believed to be sterile and the Lower Middle Gravel is rich in pointed bifaces. The site appears to show an evolutionary sequence, although the excavators are perplexed at the absence of bifaces in the Lower Gravel.

1928-1935 - Chandler studies material from Barnfield Pit and nearby Rickson's Pit. He is the first to label the assemblage as Clactonian and describe the Clacton-like characteristics of the assemblage (large flakes, wide flaking angles, plain butts, minimal retouch and chopping tools). He also identifies two phases of occupation indicated in the artefacts of the Lower Gravel – an earlier derived series and a series contemporary with the gravel formation.

1935 - Alvan Marston discovers the Swanscombe skull fragment at Barnfield Pit. As a result the Royal Anthropological Institute undertakes formal investigations at the site. Lower Gravel (LG) is subdivided into two subunits – the lower, corresponding with the LG observed by Smith & Dewey, is separated from the upper by solifluction. Clactonian artefacts are present in both. A shell layer overlies the LG, the Lower Loam (LL) overlies this (marking the end of the terrace sequence of the LG). Some patinated Clactonian artefacts were observed at the top of the LL. The Middle Gravels were also subdivided: the Older/Lower Middle Gravels (LMG) which were cut by a major channel in filled with the Upper Middle Gravel (UMG). Bifaces were reported from the OMG but Clactonian artefacts were also reported. The upshot of all this was that the LG and LL were considered archaeologically Clactonian and the MG Acheulean with occasional Clactonian elements (e.g. scrapers).

1938 – Swanscombe Committee report, following Marston – Chronology largely driven by typology.

1940 – Patterson's reworking of the Barnfield sequence.

1948 – Limited excavations by Ashley Montagu in MG only.

1955 – Wymer excavation (although various smaller investigations since 1950) mainly of the UMG which he identifies as Middle Acheulean and subdivides into five basic subunits. Wymer claims there are three assemblages present at Swanscombe: the lower, earlier Clactonian, and two Acheulean assemblages, supporting his view that the Clactonian preceded the Acheulean in Britain. Wymer also asserts that there is no difference between the Clactonian at Swanscombe and that at Clacton.

1968-72 – Waechter excavation at Barnfield Pit identifies the following sequence of deposits: LMG, LL surface, LL (including Knapping floor and Shelly sand/Pebble complex), LL base, LL/LG interface, Midden, LG 1 to 4. The excavation targets the lower part of the sequence.

1996 - Conway, McNabb & Ashton publish 1968-72 excavation.

Text Box 3.2. Swanscombe investigations

The most recent analysis of the material and synthesis of the excavations undertaken at the site is that undertaken by Conway, McNabb and Ashton in the mid 1990s. Bringing together evidence from the Waechter excavations with that from earlier explorations, and undertaking a reanalysis of the lithic, faunal and palaeoenvironmental data they put together a clearer picture of this key Swanscombe site. Much of the analysis looked at the relationship between the Middle Gravels and the nature of the associated fluvial activity. However, while important, it is the Lower Loam and Lower Gravels that concern us here, as it is these deposits with which the Clactonian assemblage is associated.

The Lower Gravel is a fluvial deposit laid down shortly after the end of the Anglian Glaciation and the early part of the subsequent interglacial; associated palaeolenvironmental information suggests that this occurred in a fully temperate mixed woodland and open grassland environment. Subsequently a smaller channel was cut at the top of the Lower Gravel sequence in similar climatic and environmental conditions, which was then filled with shelly sand and large quantity of animal bone. A further channel cut into the top of the Lower Gravel was filled by the Lower Loam which appears to have been laid down in a low energy depositional environment, oscillating between clear running water and still, marshy conditions. The pollen from this level suggests a mixed, oak forest with open areas characteristic of the Hoxnian interglacial. This deposition of the Lower Loam was not continuous and there is evidence of both channel re-cutting and dry surface formation within the Lower Loam deposit. One of these dry surface horizons contains footprints, and another is associated with the Lower Loam knapping floor (see text box). The top of the Lower Loam appears to have been exposed long enough for a land surface with a soil profile to form, confirmed by a further footprint horizon, which seems to be consistent with even more open environment.

Ricksons Pit

The second Clactonian location for the Swanscombe area is Rickson's Pit. This pit was observed by a number of researchers including Dewey (1930, 1932, 1959), Burchell (1934) and Tester (1985) and excavated by Louis Leakey in the 1930s, although he never published the site. The depositional sequence consisted of: a coarse gravel overlying chalk (from which the artefacts were excavated), itself overlain by an archaeologically sterile white sand with shell patches, overlain by bedded sand, then overlain by interbedded sand and gravels and finally capped by colluvium. The excavated assemblage is from the lower gravel which is believed to be a continuation of the Lower Gravel at Barnfield Pit. The Leakey assemblage does not contain any handaxes, however Dewey's observations at the pit do record some handaxes from higher in the sequence (Dewey 1959) and McNabb has also noted a number of thinning flakes from the lowest gravel present in the material collected by Marston (McNabb 2007), however the overwhelming assemblage from his collection lacks handaxes.

The Assemblages

The assemblages from both Rickson's and Barnfield Pit are dominated by medium to large, unretouched, hard-hammer flakes. However, it is interesting to note that the assemblages which were a least in part, if not largely, collected (such as Chandler's collection from the Lower Gravel at Barnfield) and contain considerably higher number of flaked pieces (see table 3.7), possibly because these are larger on the whole and easier to spot. However, for the Lower Gravels, Midden and Lower Middle Gravels from the Waechter excavation flakes and flake tools make up around 90% of the assemblage.

	LG Barnfield Pit, Chandler		**LG Waechter 1**		**LG Waechter 2**		**LG Waechter 3**		**LG Waechter 4**		**LG Midden Waechter**		**LMG Waechter**		**Rickson's Pit, Leakey**		**Total**	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	**N**	**%**
Flaked pieces	65	53.3	9	5.3	13	6.1	10	5.9	35	10.8	9	7.5	12	8.3	25	3.9	**178**	**9.3**
Non classic biface	2	1.65	1	0.6	0	0	0	0	1	0.3	0	0	2	1.4	0	0	**6**	**0.3**
Flakes (incl. broken)	42	34.4	139	81.8	188	87	139	82.2	261	80.3	103	85.8	119	82.1	535	82.4	**1526**	**79.6**
Retouched tools	12	9.85	18	10.6	13	6	14	8.3	26	8	8	6.7	9	6.2	46	7.1	**146**	**7.6**
Debris	0	0	3	1.7	2	0.9	6	3.6	1	0.3	0	0	2	1.4	6	0.9	**20**	**1**
Hammer stones & modified natural	1	0.8	0	0	0	0	0	0	1	0.3	0	0	1	0.7	37	5.7	**40**	**2.1**
TOTAL	**122**	**100**	**170**	**100**	**216**	**100**	**169**	**100**	**325**	**100**	**120**	**100**	**145**	**100**	**649**	**100**	**1916**	**100**

Table 3.6: Distribution of artefact types from Swanscombe assemblages

Lower Loam Knapping Floor

Despite having been considered archaeologically sterile by many previous researchers the Waechter excavations recovered many artefacts from this deposit. Including an apparently *in situ* knapping surface known as the Lower Loam knapping floor. The Loam itself was deposited by slow energy, possibly stagnant water although it is clear that this sedimentation was intermittently interrupted by channel cutting and conversely by dry periods when things dried out sufficiently for a useable surface to form as indicated by the knapping floor. The area described as the knapping floor is bounded to the north by a small stream with the surface dropping off o the south.

Despite the *in situ* nature of the knapping floor assemblage it is strikingly similar to the other derived assemblages. The Lower Loam knapping floor has however provided researchers with an interesting opportunity to study the knapping sequence for the Swanscombe Clactonian assemblages as studies have demonstrated the presence of 11 refit groups, which have been studied by Marc Newcomer (1970) and subsequently by Nick Ashton and John McNabb (1996).

Interestingly these refits predominantly relate to episodes of parallel knapping, although often only a few flakes long. There is only a single refit (group D) which may represent alternate knapping, and another (group A) which shows a combination of alternate and parallel knapping. This last example displays the longest sequence observable from the refit groups with evidence for a total of 14 removals. The difficulty with the LL knapping floor is that cores have been removed so we are unable to establish whether the flaking strategies they display correlate with those seen in the refits. Given the prevalence of alternate flaking observed in the core assemblages from the other levels one might suggest that in fact a combination of alternate and parallel flaking is routinely employed with alternate flaking more visible in the discarded cores. This could occur for a number of reasons: firstly 'salami slice' type removals would appear as single removals on a core as each flake removes the scar of the previous one, secondly alternate flaking may mask evidence of earlier parallel flaking episodes while evidence of alternate flaking is less easily removed.

Text Box 3.3. Lower Loam Knapping Floor

The size distribution is similar to that seen for the Clacton localities with the majority of artefacts falling between 5 and 10cm in length (see figure 3.10). The exception to this is Chandler's collection from Barnfield Pit which shows a wider distribution of artefact lengths with the majority between 6 and 17cm. This may reflect the greater proportion of flaked pieces, which tend to be larger (see table 3.7), present in this assemblage.

		Length (mm)
Flaked Pieces	***Mean***	**101.6**
	Min	35
	Max	300
	Range	265
	Standard Deviation	44.0
	Count	184
Flakes	***Mean***	**60.5**
	Min	14
	Max	166
	Range	152
	Standard Deviation	23.9
	Count	1526
Retouched	***Mean***	**64.9**
	Min	24
	Max	151
	Range	127
	Standard Deviation	21.7
	Count	146

Table 3.7: Length of artefacts from all Swanscombe assemblages in mm.

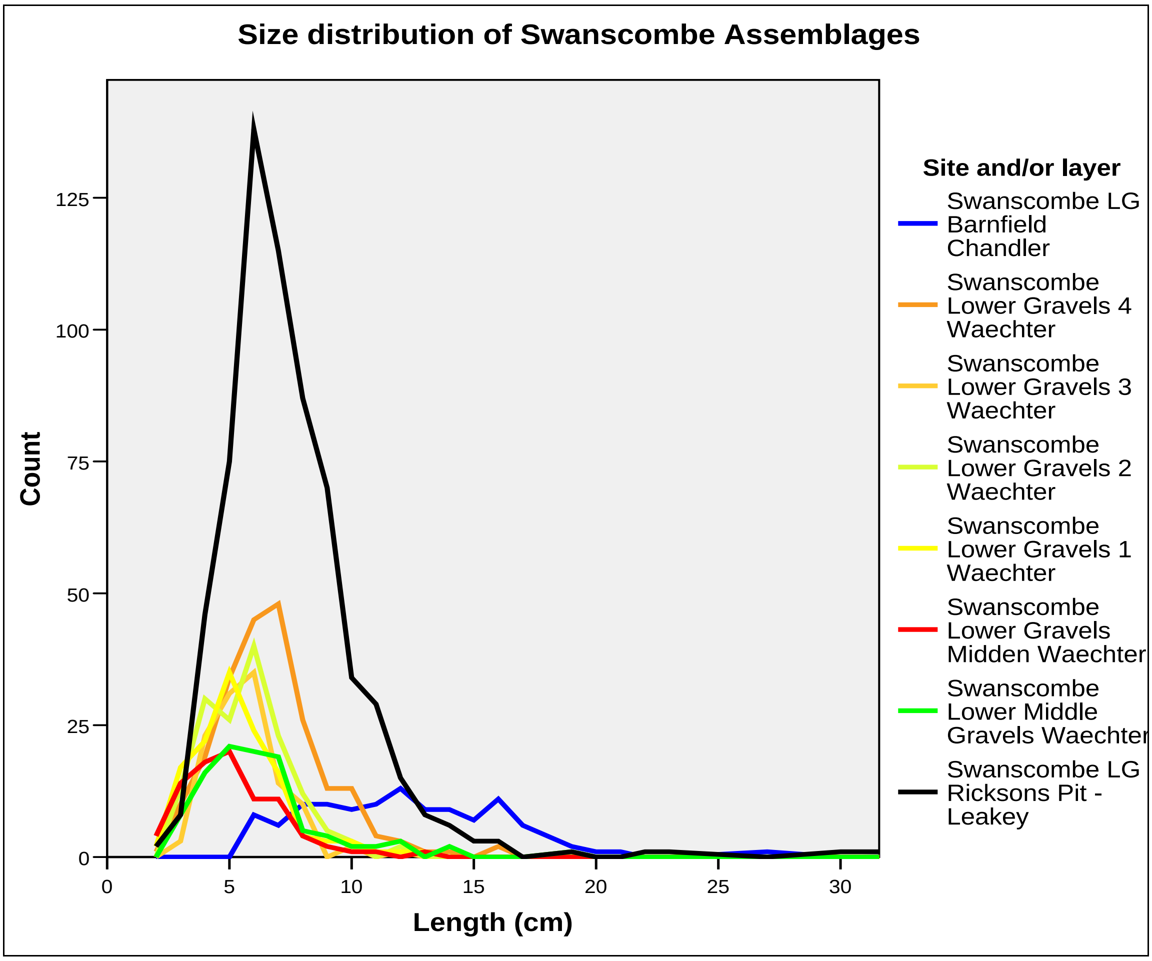

Figure 3.10: graph showing artefact size for different Swanscombe assemblages.

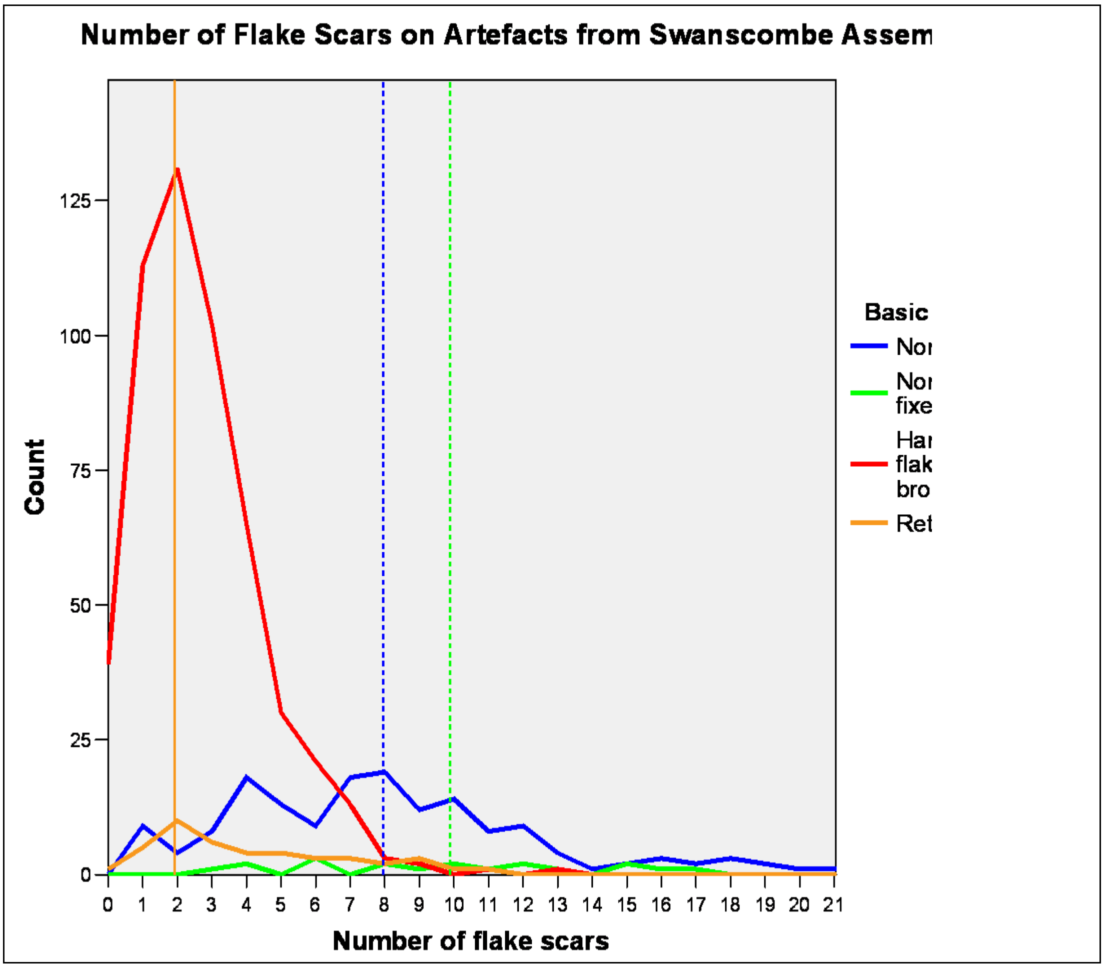

Figure 3.11. Graph showing the number of flake scars for different artefact types for all Swanscombe assemblages.

The flaking strategy applied in the Swanscombe assemblages is simple and presents a similar pattern to that observed in the Clacton-on-Sea sites, with non-PCT flaked pieces dominating. However, the fixed perimeter and non-classic bifacially worked pieces are slightly more prominent than the Clacton sites (see figure 3.12).

The flaking strategy is dominated by alternate flaking; over half the flaked pieces display alternate flaking, including those which display a combination of alternative and parallel flaking. Parallel flaking alone is almost completely absent and single removals are rare. When we consider that the majority of flaked pieces described as mixed technique contain an element of alternate flaking, this flaking approach could be considered to be the preferred technique. However, as the refits from the Lower Loam knapping floor show, this is not necessarily reflective of the knapping strategy employed and may be more a reflection of the final stages of knapping or of the occasional use of a technique which is more easily observed and identified (i.e. alternate knapping).

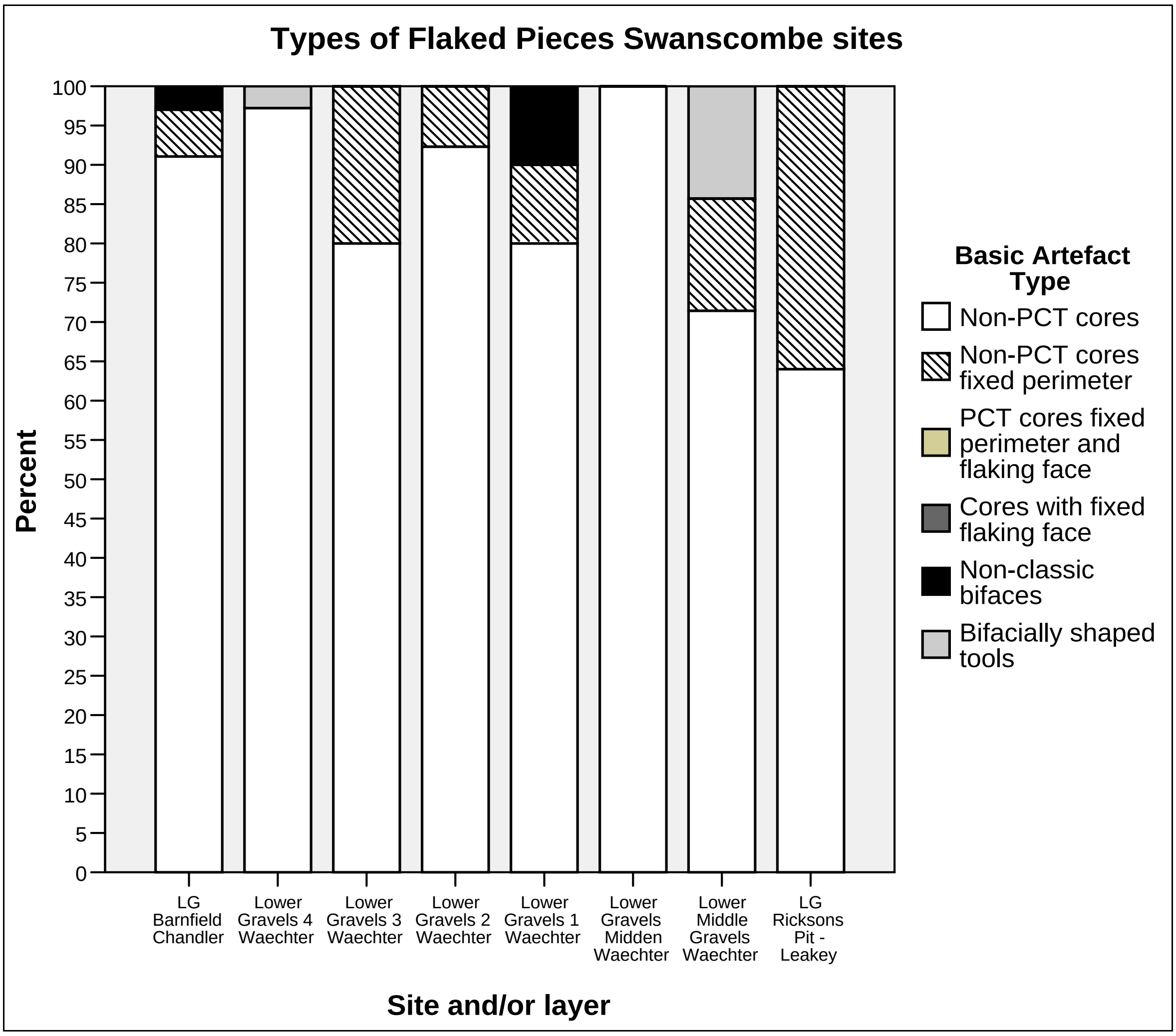

Figure 3.12. Distribution of types of flaked artefacts from Swanscombe assemblages

As with Clacton-on-Sea, the distribution of Toth types is consistent with the presence of a complete knapping sequence, although, with the exception of the Lower Loam knapping floor the assemblages have been re-deposited and/or reworked to an uncertain extent.

Again retouched tools make up a small portion of the assemblage (typically <10%), and display very little standardization. Denticulates are absent, and flaked flakes and flaked flake spalls make up the majority of the retouched component (>80%) with scrapers, retouched notches, multiple and non-diagnostic retouched pieces making up the remainder.

	LG Barnfield Pit, Chandler		LG Waechter 1		LG Waechter 2		LG Waechter 3		LG Waechter 4		LG Midden Waechter		LMG Waechter		Rickson's Pit, Leakey		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Alternate Flaking	34	52.3	2	22.2	8	61.5	3	30	16	44.4	4	44.4	4	33.3	7	29.2	78	43.8
Alternate & parallel	8	12.3	1	11.1	2	15.4	2	20	2	5.6	0	0	0	0	0	0	15	8.4
Parallel flaking	0	0	1	11.1	0	0	1	10	2	5.6	0	0	1	8.3	0	0	5	2.8
Single removals	3	4.6	1	11.1	0	0	0	0	3	8.3	1	11.1	1	8.3	2	8.3	11	6.2
Mixed techniques	16	24.6	2	22.2	2	15.4	0	0	9	25	4	44.4	3	25	14	58.3	50	28.1
Other non PCT	0	0	1	11.1	0	0	2	20	4	11.1	0	0	1	8.3	0	0	8	4.5
Centrepetal alternate	2	3.1	1	11.1	1	7.7	2	20	0	0	0	0	2	16.7	1	4.2	9	5.1
Other fised perimeter	2	3.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1.1
TOTAL	65	100	9	100	13	100	10	100	36	100	9	100	12	100	24	100	178	100

Table 3.8. Flaking strategies observed for flaked pieces from Swanscombe localities.

	LG Barnfield Pit, Chandler		LG Waechter 1		LG Waechter 2		LG Waechter 3		LG Waechter 4		LG Midden Waechter		LMG Waechter		Rickson's Pit, Leakey		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Scraper	2	18.2	1	5.6	0	0	1	7.1	0	0	0	0	2	22.2	1	2.4	7	5
End Scraper	1	9.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.7
Denticulate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Retouched notch	0	0	1	5.6	0	0	0	0	0	0	1	12.5	1	11.1	0	0	3	2.1
Point	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2.4	1	0.7
Multiple	0	0	0	0	0	0	0	0	2	7.7	0	0	1	11.1	3	7.1	6	4.3
Non diagnostic	0	0	1	5.6	0	0	2	14.3	1	3.8	0	0	1	11.1	0	0	5	3.5
Wedge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flaked flake & spall	8	72.7	15	83.3	13	100	11	78.6	23	88.5	7	87.5	4	44.4	37	88.1	118	83.7
Utilised	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	11	100	18	100	13	100	14	100	26	100	8	100	9	100	42	100	141	100

Table 3.9: Retouched tool quantities from Swanscombe assemblages

The assemblages are characterised by simple cores, flaked alternatively to produce medium to large size flakes which make up the majority of the assemblages. The artefacts are in secondary context, the *in situ* material from the Lower Loam knapping floor presents a similar picture so confirming this. Here a number of chronologically distinct instances of non-biface assemblage production are identifiable: the first is associated with the Lower Gravel, the second with the Lower Gravel Midden, and the third with the Lower Loam knapping floor. While there may be more the presence of these three instances is irrefutable.

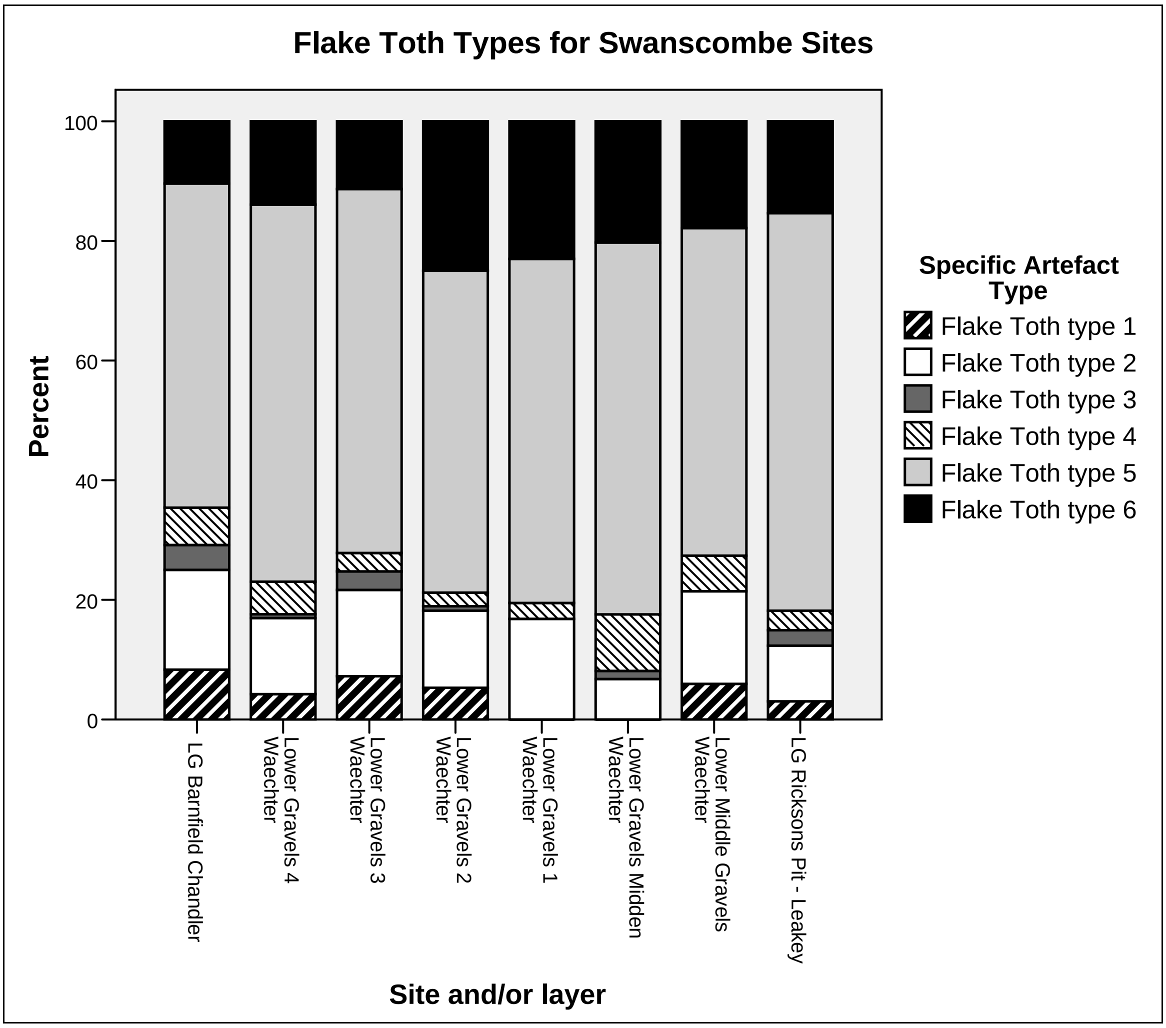

Figure 3.13 – graph showing Toth types for Swanscombe assemblages

Ebbsfleet:

Recently commercial evaluations prior to the construction of the Channel Tunnel Rail Link, led by Francis Wenban-Smith, have revealed further evidence of Clactonian sites in the Swanscombe area (Wenban-Smith *et al.* 2006). Excavations in the Ebbsfleet valley, a small south bank tributary of the Thames, have revealed the remains of a straight tusked elephant (*Palaeoloxodon antiquus*) in association with c. 100 stone tools; a further concentration of c. 1500 similar artefacts has been identified nearby. The lithic assemblage, which lacks both bifaces and Levallois, is in mint condition with some use damage, and believed to be indicative of some *in situ* tool manufacture and use. The elephant and lithic assemblage are within lacustrine deposits which are overlain by a gravel deposit which contains abundant mint condition bifaces (Wenban-

Smith *et al.* 2006; see figure 3.14). The impressive preservation of the site and the clear stratification of NBA and handaxe rich assemblages make this one of the key sites in the Swanscombe area providing support for a separate Clactonian industry.

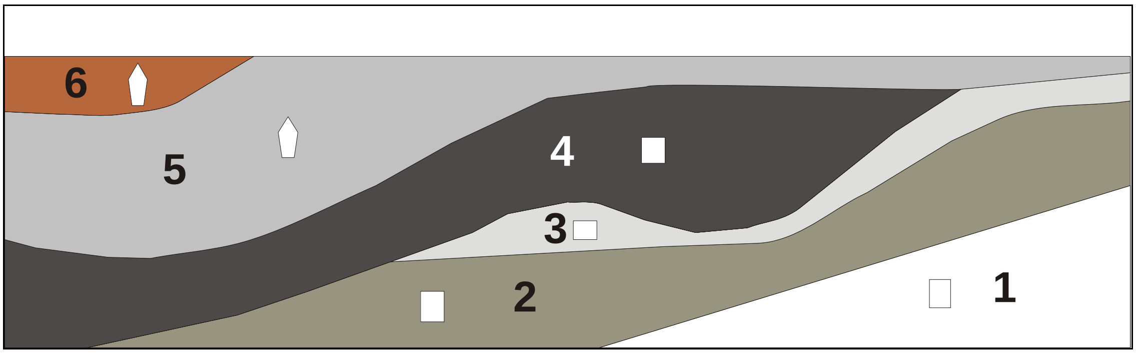

Figure 3.14: Simplified stratigraphy for Southfleet Road, Ebbsfleet (after Wenban-Smith *et al.* 2006). 1- Soliflucted chalk with sand; 2 – Fluvial sand with clay laminations and occasional pebble patches; 3 – Grey clay with tuffacious channel. Lacustrine deposits with occasional dessication and tuffaceous activity, Paleoxodon remains recovered from this deposit; 4 – Mixed clay gravel fill of basin; 5 – Bedded gravel, well sorted with sand lenses; 6 – Brown clay/silt ‘brick earth’.

Overall the complex of sites at Swanscombe presents strong evidence of the widespread manufacture and use of an industrial complex in which handaxes are conspicuously absent. The recent discoveries at Southfleet have provided important excavated evidence to support the traditional interpretation of earlier Swanscombe excavations. The assemblages, dominated again by medium to large flakes produced from unprepared cores knapped by alternate flaking, at least in the final stages before discard, are strikingly similar to those recorded from Clacton-on-Sea.

In summary the Swanscombe assemblages represent hominin activity around freshwater channels with both re-deposited and disturbed/*in situ* primary context assemblages present which indicate at least three chronologically distinct NBA episodes - the assemblage within the Lower Gravels, that associated with the Lower Gravels Midden deposit and the Lower Loam knapping floor. Evidence for a full knapping sequence is present, with the exception of the Lower Loam Knapping Floor where refitting has shown some pieces have been removed. The knapping is dominated by alternate flaking of non-prepared cores to produce simple medium to large flakes. There are very few retouched tools, and the retouched component is dominated by flaked flakes. Evidence for handaxe manufacture is extremely slight restricted to a few reported thinning flakes and the black ovate from the base of the Lower Gravels.

Globe Pit, Little Thurrock, Kent

This site in the Lower Thames valley was originally discovered by John Wymer's father in 1911 and was later excavated by John himself in the 1950s when he identified it as a Clactonian site (Wymer 1957). Subsequently there have been excavations by Snelling (1964) and Bridgland and Harding (1993) and a number of other sections have been investigated (Conway 1970; Wymer 1985; West 1969). The site consists of channel margin deposits which relate to the northern side of the paleo-Thames. Excavations by Bridgland (Bridgland 1994; Bridgland and Harding 1993) identified a single gravel deposit containing the Clactonian assemblage, rather than the two distinct gravels identified by previous excavators. For Bridgland this gravel dates from the beginning of MIS9/end of MIS10. This gravel is overlain by a land surface with evidence of ice wedges, in turn overlain by a brickearth dated to MIS9 and believed to correspond to the Lynch Hill/Corbets Tey Formation. The Clactonian assemblage was recovered from the upper part of this gravel at c. 15m OD and there are disputed claims for the presence of handaxes and thinning flakes (see McNabb 2007; White 2000 for a summary). The assemblage is small and in a secondary context within channel margin gravel deposits; for these reasons McNabb has questioned its ability to inform on the establishment of a Clactonian non-handaxe type assemblage at this location. While the nature of the channel margin deposits and the difficulties in establishing time depth may make it difficult to establish the site type, it may be able to contribute to a landscape based understanding of Lower Palaeolithic assemblages in Southern Britain such as that proposed in recent work at East Farm, Barnham St. Gregory in Suffolk (Ashton *et al.* 1998).

Greenlands Pit, Purfleet, Kent

A small assemblage of around 50 artefacts has been recovered from a shelly gravel overlying a gravel dated to MIS10/9 at the base of the sequence (Schreve *et al.* 2002). White has suggested that the assemblage is Clactonian and relates to occupation very early in the MIS9 interglacial. The small size of the assemblage and the low density of the artefacts set this assemblage apart from the Clactonian assemblages within MIS11, and make it difficult to assign it the Clactonian label, but the lack of handaxes in this early interglacial is interesting.

Rainbow Bar, Hampshire

This site is a mixed secondary context deposit associated with a gravel bar just of the Hampshire coast. The origin of this gravel is currently unknown and it is likely that the site represents a palimpsest of artefacts from the Lower Palaeolithic through to the Neolithic, making the assemblage extremely difficult to assess. From a visit to the site I am persuaded that it is most likely a Holocene gravel bar rather than representing remnant terrace deposits of the Palaeo-Solent. The Palaeolithic artefacts in my view have derived from the nearby cliffs from which numerous Palaeolithic artefacts have been reported (Hampshire County Council Historic Environment Record). Although numerous, the artefacts have all been collected rather than excavated, and the context and taphonomy of the assemblage are extremely uncertain. Without further stratigraphic information from this site, it is interesting to note but can currently contribute little to our understanding of the Clactonian.

East Farm, Barnham St. Gregory, Suffolk

This site was originally upheld as an example in support of the Clactonian as the evolutionary precursor to the Acheulean (Paterson 1937), a belief commonly held throughout much of the last century (see Chapter One). John Wymer investigated the site in 1979, however, and although he identified an *in situ* assemblage, he found no sign of the bifaces recorded in previous investigations and the assemblage was interpreted as Clactonian (Wymer 1985; McNabb 1998). The site was revisited by the British Museum in the early 1990s (Ashton *et al.* 1998), and the resulting investigations and reinterpretation demonstrated that the situation was much more complex than previously thought. Subsequently the question of whether or not a genuine Clactonian assemblage is present at the site has been keenly debated (see Ashton *et al.* 1998; McNabb 2007; Wenban-Smith 1998; White 2000).

The key debate centres on the presence of both rolled and fresh material in the gravel deposits: biface manufacturing elements are present in both at some locations, but to differing degrees. Even in Area 1, where Wymer's 1979 investigation had been focussed, and where bifaces were notably lacking, some biface manufacturing flakes were recovered in the most recent excavations (Ashton *et al.* 1998). Earlier investigations had suggested that there was a clear chronological separation between the biface and non-biface manufacturing assemblages. However, the more recent excavations have raised the interesting possibility that a complex and changing use of the landscape may play a key role in the taphonomy of a site, and that in fact handaxes form part of this technocomplex, albeit in different parts of the landscape, during each period of activity.

The 1990s excavations revealed a more complex geological sequence than had previously been attributed to the pit. The lowest two units were identified as glacial in origin, probably relating to the end of the Anglian glaciation, and represent glaciofluvial deposition within a deep channel cut into chalk. A further channel was cut when the ice sheet retreated, and this was subsequently filled with solifluction diamictons (Unit 3) and a series of fine grained deposits (Unit 5). The surface of the gravel (the soliflucted gravel fill of this original channel) at the edge of the channel (Unit 1) had been intermittently flooded, resulting in a surface of coarse flint cobbles, overlain by silty sand (Unit 5e). As the channel filled and dried out a soil was able to form (Unit 6 – Wymer's Black clay), Brickearth (Unit 7) then formed over this through periodic sedimentation, within which poorly developed soil horizons are occasionally visible. Artefacts have principally been recovered from Unit 4 (cobble layer) and the upper part of overlying Unit 5 – particularly Unit 5e (yellow silty sand). The corresponding faunal, palynological and lithostratigraphic evidence support the hypothesis that the archaeological deposits date to the early part of the Hoxnian interglacial (Ashton *et al*. 1998) – and would equate with MIS 11.

The assemblage is dominated by hard hammer flakes from alternate and parallel flaked cores and few retouched tools (Ashton 1998). The retouched tools are dominated by flaked flakes. Importantly, however, there are two assemblages which are the result of biface manufacture (Area V and Area IV.4). In all, two bifaces (one a roughout) and 268 biface manufacturing flakes were recovered from Area IV cobbled surface (Unit 4), 37.6% of the assemblage from Area IV Unit 4, and a further 52 biface thinning flakes from Area V clay (Unit 5d), 21.6% of the Area V assemblage (total artefacts recovered from Barnfield 3457) (Ashton 1998). A single biface was recovered from Area I black clay.

The positioning of artefacts from different excavation areas in corresponding stratigraphic units has led the excavators to propose a broad contemporaneity of the artefacts, with the assemblages indicative of spatial rather than chronological distribution. Further analysis of the artefacts has suggested that while not necessarily completely *in situ* (possibly with the exception of Area V) the artefacts have not undergone much post-depositional disturbance. This makes the presence of biface and non-biface 'assemblages' from Barnham all the more interesting.

Knapping experiments undertaken by the excavators demonstrated that raw material posed no constraint on the manufacture of bifaces in those areas where there was no evidence of their manufacture. Although they do note that frost fracturing of the flint did affect a significant proportion of the nodules, it was possible to identify quality flint prior to, or shortly after the commencement of, knapping in most instances. However, the excavators reject the traditional Clactonian vs. Acheulean explanation for the differences between the assemblages. Rather they argue that the assemblages are all part of a pene-contemporaneous landsurface and reflect the differential use of this landscape: a 'resource and landscape model' (Ashton et al 1998), in which bifaces are made in some places, and not in others.

While no longer seen as a British NBA site, Barnham highlights some of the pitfalls in trying to identify and distinguish between Lower Palaeolithic assemblages: as we are able to take a broader and broader view, our interpretations and understanding may completely alter.

History of exploration at Barnham

1891 - Barnham is cited as site of geological and paleontological interest with find of handaxes reported from the area(Whitaker et al 1981)

1913 - W. G. Clarke describes the handaxes and artefacts from around Barnham, and also presents a section from East Farm excavated by H. Dixon Hewitt.

1933-36 – T. T. Paterson investigates an area of $25m^2$ at East Farm Pit as part of his PhD (1942) looking into connections between climate change, material culture and human evolution. He describes the stratigraphic sequence and identifies six different industries: five of which (A to E by their patination, the sixth and uppermost(F) is a biface industry from the upper loams/brickearth. Overall the sequence is a progressive one, with technological improvement visible through time.

1979 – John Wymer excavates a section at East Farm Pit (Wymer 1985) and reinterprets the geology, with Jim Rose, in a simplified sequence: Lowestoft Till at the base, cut by a deep channel which is filled with outwash gravels with solifluction at the top, then covered by brickearth. The artefacts are from the top of the solifluction and base of the brickearth, at the interface of which a paleosol (black clay) is tentatively identified. Wymer demonstrates that at least some of the material is *in situ* by refitting a core with 13 flakes. For Wymer there is no distinction between the artefacts and no evidence for a biface industry; the whole assemblage is Clactonian.

1982 – Ohel suggests that the Barnham material may be a mixture of both Acheulean and Clactonian assemblages based on studies of the Patterson material.

1989-1994 – British Museum excavations (Ashton *et al.* 1998): 1989 - re-exposed and deepened Wymer's section (Area I); 1990 - 15 test pits excavated, Area II opened (5m by 5m); 1991 - Area I expanded (Area I East and Area I West) to excavate *in situ* archaeology, Area III excavated; 1992 - ten further test pits to west of the Pit, expansion of Area I East, Area III (south section) extended; trench excavated to link Area III and Area I; 1993 - completion of Area I excavation, excavation of two sections in Area IV, opening up of Area V, further test pits; 1994 - expansion of excavation in Area IV (7m by 3m), excavation in Area III and Area V continued.

Text Box 3.4. Investigations at Barnham St Gregory, Suffolk

British Non-Biface Assemblages

The sites described above display a number of similarities; some more so than others. When considered together there are a number of patterns that emerge:

The majority of the sites are located in the Lower Thames Valley, associated with water-lain deposits of tributaries and channels of a braided Palaeo-Thames. However, it may be too easy to place much emphasis on this geographical concentration and there are tantalising glimpses of sites outside of this core area (e.g. East Farm Pit, Barnham), although not at the scale seen in the Clacton and Swanscombe assemblages. That the majority of the large assemblages from Middle Pleistocene deposits in England come from this area is in no small way due to the intensity of gravel extraction and development, which in turn has both enabled and driven a level of Palaeolithic investigation not seen elsewhere in the UK.

The assemblages are all associated with freshwater streams and channels. Again distinguishing the extent to which this represents a real pattern of paleo-distribution rather than reflecting the development led discovery of these sites is unclear. By their very nature quarries occur where there are mineral deposits to be won, and for Pleistocene deposits these are usual fluvial in origin.

Chronologically the sites seem to cluster around the beginning of the MIS11 interglacial following the severe Anglian glaciation. Interestingly there are possible exceptions to this rule in the Purfleet area with a few small assemblages potentially from MIS10/9; for example, Little Thurrock, occurs in deposits currently interpreted as relating to MIS9 or even late MIS10. However, there are no instances of NBAs associated with later interglacial conditions and these more recent non-biface assemblages are small (less than 100 artefacts) and low density, unlike Clacton and Swanscombe.

At the majority of the sites there is evidence for more than one episode of NBA production. For example, both Clacton-on-Sea and Swanscombe localities stratigraphically present a minimum of three chronologically distinct episodes of NBA production. Technologically these assemblages are all extremely similar. They lack prepared cores, the cores display a preference for alternate, and occasionally parallel knapping which produces medium to large hard hammer flakes. There are typically few retouched tools with the majority being flaked flakes or scrapers.

In my view, the Clactonian assemblages from Swanscombe and Clacton localities are genuine instances of Non-Biface Assemblages and reflect a consistent and repeated behavioural repertoire in the early stages of MIS 11 in the Thames valley. The assemblages are characterised principally by a lack of bifaces, simple retouched tools (flakes, scrapers) and little indication of core preparation.

Chapter Four

Central and Eastern Europe

The area of Central and Eastern Europe has long been associated with a paucity of bifaces (e.g. Collins 1969; Gamble 1999; McNabb 2007; Svoboda 1989; Vértes 1965; Valoch 1996; White 2000) and has on occasions been postulated as a possible Clactonian homeland (e.g. Collins 1969). Analysis of the material from this region is made more difficult by language – few of the sites are widely published in English making a literature review challenging.

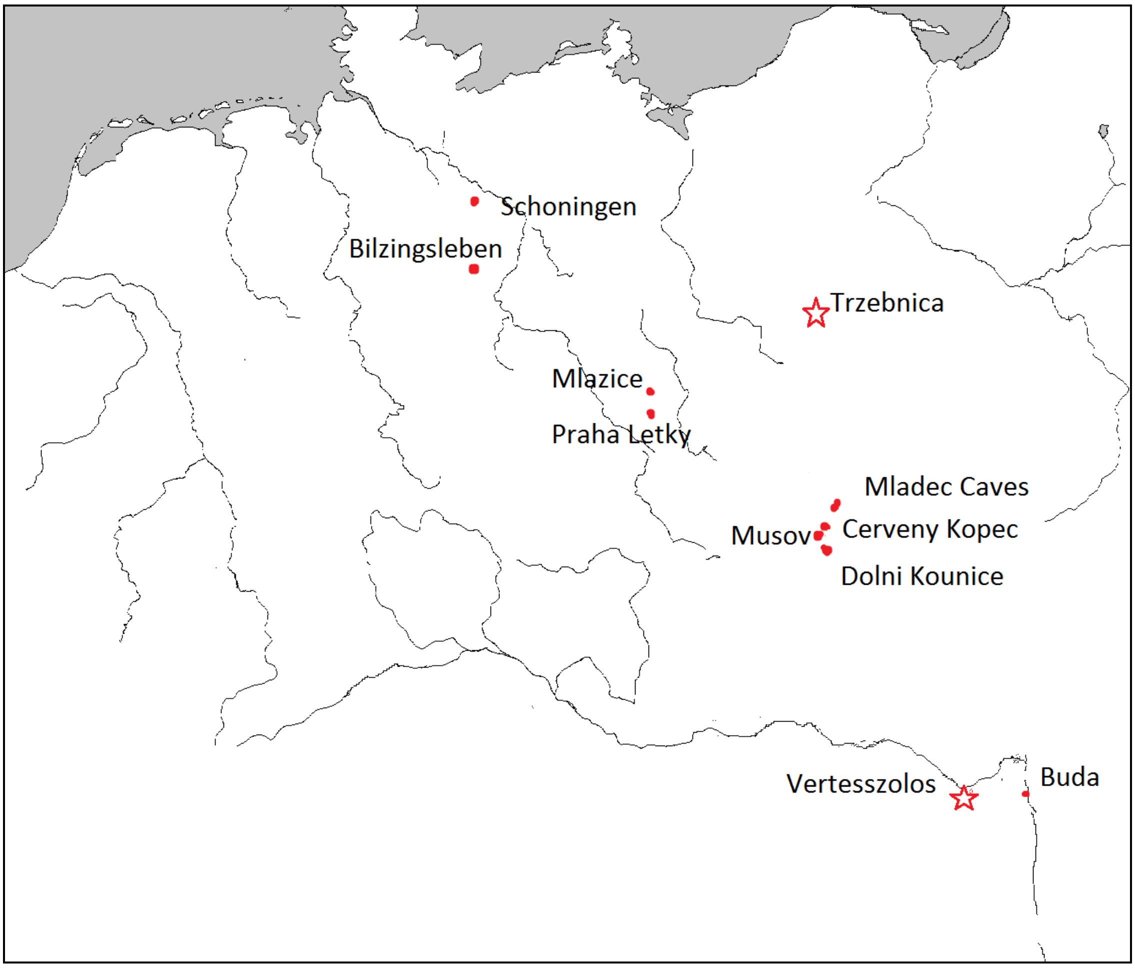

Figure 4.1: Map showing distribution of sites mentioned in the text.

The area of central and eastern Europe discussed here corresponds roughly with North Central and South East areas described by Gamble (1999) and includes modern day Germany, Poland, Czech Republic, Slovakia, Hungary, Romania; a huge area comprising roughly half the landmass of Europe. However, much of this area is unified in having had an archaeological past heavily influenced by Russian and German traditions (see Chapter One); and perhaps also (with the exception of Germany) an absence of the sort of intensive Lower Palaeolithic investigation seen further west. The area is generally low lying, although it is crossed by the Carpathian mountains to the east and bounded by the alps to the west. Most of the Palaeolithic sites of this region are open-air localities associated with river or lake sides; in some instances (e.g. Bilzingsleben and Vértesszőlős) the formation of travertine has sealed the sites, preserving them more or less *in situ*.

Certain areas of this region have yielded a large number of sites, e.g. the Czech Republic (see gazetteer), whilst in others, such as Hungary, Lower Palaeolithic finds are extremely rare. We must be careful at placing too much emphasis on the absence of material from some of these areas however, whilst in some instance this may reflect a lack of survey rather than genuine absence, in others (such as Poland) this may be due to the depth of the Pleistoecene geological deposits below the modern groundsurface. On closer inspection, however, many of those sites which are reported are problematic. Many consist of only a few artefacts: for example, Červený Kopec in Moravia has the most complete fluvial sequence in Central Europe, a famous Bohunician assemblage in its upper layers, but only a few quartz choppers and flint flakes have been found from its lower levels (Svoboda *et al.* 1994; Svoboda, Ložek, and Vlček 1996). Other isolated finds have been made at sites such as Dolní Kounice, Ivaň, and Mušov in Moravia, Mlazice near Mělník in Bohemia, the Mladeč Caves, and Praha-Letky. However, the site of Raèinìves has a more promising assemblage of nearly 200 artefacts (Fridrích and Sýkorová 2003). Here the assemblage lacks handaxes but dating is problematic and the presence of Levallois suggests that this is an early Middle Palaeolithic industry.
The artefactual nature of the lithics from other sites with larger assemblages (i.e. consisting of tens or hundreds of artefacts) has been challenged, e.g. Stránská Skála I, Brno-Slatina, Moravia (Valoch 1995, 1996). That many of these sites are cave sites which have been investigated primarily by paleontologists and geologists, rather than archaeologists, may explain some of the misinterpretations.

Dating presents a further significant problem for many of the claimed Lower Palaeolithic assemblages. Assumptions based on technological and typological analysis have frequently led to a description of the artefacts as *primitive*, and by implication early; assertions that in many instances have later proved misleading when the geological provenance has become clear (e.g. Přibice I, Břeclav, southern Moravia (Valoch 1996; Svoboda, Ložek, and Vlček 1996).

Vértesszőlős

The quarry site of Vértesszőlős is located to the east of the town of the same name on the fifth terrace of the Átalér River, a tributary of the Danube, in the Gerecse region of northern Hungary. In some places these terraces are covered, and thus conserved, by travertine formations; at Vértesszőlős a travertine deposit of c. 8-10m thickness has formed which, due to its good carving properties, has been exploited since Roman times. The Palaeolithic site was first discovered in the early 1960s during a geology field trip for the Eötvös Loránd University of Sciences led by M. Pécsi; Pécsi often used the quarry sites along the fault line that runs along the Western Gerecse Mountains to illustrate the geology of the area. He showed the artefacts he had collected to László Vértes, an eminent local archaeologist, who initially thought that the artefacts were Middle Palaeolithic due to the similarities with those from the site of Tata (located a few kilometres to the north) which was known to be Mousterian. However, Pécsi insisted that from the geological context and associated faunal remains the artefacts must be much older, and he eventually persuaded Vértes to excavate the site. Excavations were undertaken by Vértes at a number of localities in the Vértesszőlős quarry between 1963 and 1968. Tragically, Vértes died suddenly in 1968 before he was able to complete his work on the site and it was left to his students and colleagues to publish the results of these excavations, a process that took over 20 years (Kretzoi and Dobosi 1990). The broadly contemporary localities identified in the quarry, labelled Vértesszőlős I, II, III, and IV, are located within an area of roughly 4.5 hectares. The travertine outcrops were formed by numerous springs located along fault lines at the edge of the Gerecse Mountains. The geological context and formation processes of the site are extremely complex and not entirely understood, a situation that was not helped by the removal of large areas of *in situ* deposits during quarrying prior to the identification of the archaeological site. The nature of the site formation processes means that environmental information is available from the area through the phenomenal preservation of plant remains, such as imprints of leaves, within the travertine deposits (figure 4.2).

At Vértesszőlős II, a fissure or cave-like feature in the travertine, a large quantity of faunal remains were recovered accompanied by a few lithics. This site has been interpreted as a carnivore den, although it is also possible that the large quantity of fauna is the result of animals perishing due to increased carbon dioxide levels from the spring – carnivores may have been attracted by the carcasses and later perished themselves.

Figure 4.2. An example of a leaf impression from the Vértesszőlős site travertine. (photo H. Fluck)

At Vértesszőlős III, an area containing a large number of footprints was revealed, and below this two horizons with cultural material were identified (Kretzoi and Dobosi 1990). Vértesszőlős I, however, is the principal archaeological locality with four cultural levels identified within a bowl-like formation within the travertine (see figure 4.6). It is the lowest of these archaeological levels from which the majority of the lithic artefacts have been excavated (see table 4.1); it is also this lowest level, Level 1, which contains the largest number of faunal remains. Level 1 presents a continuous horizon of occupation debris, in places as much as 40cm thick (Kretzoi and Dobosi 1990).

Level	Lithics
Vértesszőlős I Level 1	3163
Vértesszőlős I Level 2	506
Vértesszőlős I Level 3	599

Table 4.1: Number of lithic artefacts from different cultural levels at site I, main archaeological locality (after Kretzoi & Dobosi 1990)

The travertine formation at the western edge of the Gerecse Mountains created a combination of bowl-like travertine formations (teterates) and freshwater marshy/lacustrine formations (figure 4.3). It appears that at Vértesszőlős I the hominins took advantage of the shelter offered by the vertical travertine. The bowl-like formation (see figure 4.3 and 4.4), and the availability of water would have created an ideal location for hominins to shelter. The site's location on the side of the valley overlooking the river and the low lying land to the west would again have made this an excellent location to observe animal movements (figure 4.4). The bowl-like formation may also have facilitated protection of the site from predators.

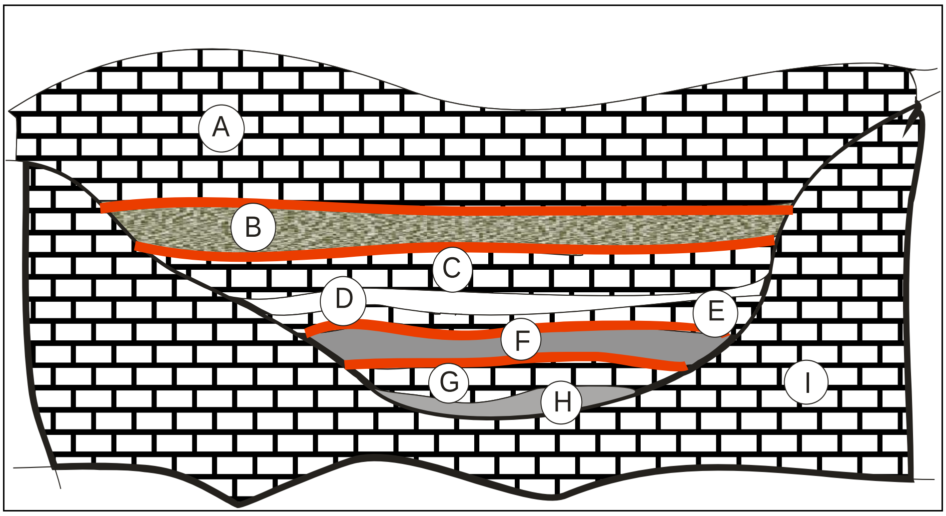

Figure 4.3: Schematic illustration of the bowl formation and stratigraphy at Vértesszőlős I. Archaeological levels shown in red. A, C, E, G, I – Travertine; B – Loess; D – Sand; F – Calcareous silt; H – Calcareous silt (Stratigraphic sequence after M. Pécsi 1990 and V. Dobosi 2003)

Figure 4.4: The Vértesszőlős I site today. (Photo H. Fluck)

In terms of the archaeology the accumulation of the layers within the ‘bowl’ presents an unusual situation for an open air site giving it a clear boundary. The relationship between the localities is not well understood, however. From the archaeological and faunal material it appears that Vértesszőlős I is the main focus of human occupation with more opportunistic human use of the other localities. Although difficult to assess the contemporaneity of the human activity at the different Vértesszőlős localities, however, what is clear is that the area was repeatedly occupied over many years, with periods of hominin absence of sufficient lenght of time for travertine to form over previous occupaton levels.

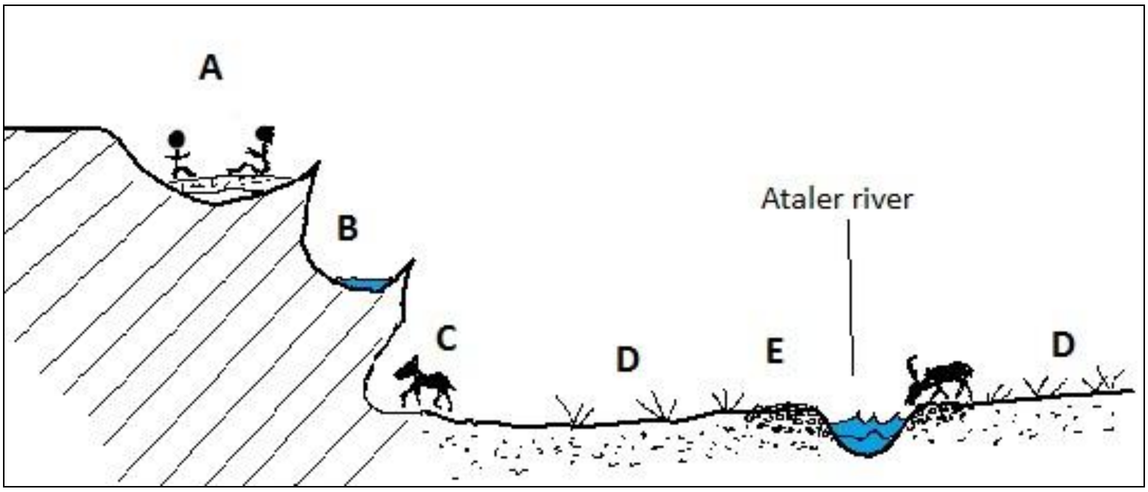

Figure 4.5. Schematic drawing of Vertesszolos localities. A - Site 1; B – active spring; C - Site III; D – Marshy area/Ataler floodplain; E – Ataler gravel deposits. Hatched areas represent teterate depostis. (Drawing H. Fluck)

Figure 4.6. Panoramic view showing the location of the Vértesszőlős site (arrow). The slopes in the middle ground represent higher river terraces of the Átalér River. In the background are the Vértes Hills, the southern part of the Western Gerecse Mountains (part of the Transdanubian Mountains) (photo H. Fluck)

The Vértesszőlős Environment

Vértesszőlős presents a range of data from which the climate and surrounding environment at the time of hominin occupation can be inferred. Some absolute dates have been obtained for the travertine deposits at the site, however, these are not without their problems (e.g. see Moncel 2003). Currently, though, the consensus appears to be in favour of a MIS 13 date for the site (e.g. see Bridgland *et al.* 2006; Dobosi 2003; Osmond 1990). The hominins inhabited the area at a time of cooling climate; the faunal remains (see table 4.2) indicate species inhabiting open forested conditions. The hominins occupied the travertine basins while they were relatively dry; a fact that is consistent with an occupation at the beginning, or end, of a cool period when spring activity is understood to be at its lowest. The faunal assemblages from the various localities have been used to paint a picture of the Vértesszőlős hominins as targeting large animals such as red deer and rhinoceros for food, possibly hunting them (Kretzoi 1990). However, this interpretation is based largely upon the age profile of the bones from site I. Whether the hominins were actively hunting these animals or taking advantage of the locality to target recent kills made by other predators is unclear. The suggestion has been made that some of the springs may have emitted toxic gasses (Kretzoi and Dobosi 1990) may have provided another source of animal carcasses for those hominins quick enough to move the carcasses to safety. It is interesting, though, that if, as they appear, the faunal remains from site I were accumulated by human activity, why the hominins did not also use the bone to make tools. There are bone tools reported from the site; however the pictures included in the publications are far from convincing, and none was observed during analysis of the collection.

Figure 4.7. The skull fragment (Samuel) recovered near Vértesszölös I. (Photo H. Fluck)

Species	No. Finds	Location	Layer	Notes
Bison priscus suessenbomensis	30	Site I	All	Steppe dwelling
Bison schoetensacki	80	SiteI	All (70% in level1)	Forest dwelling
Cervus elaphus sp,	528	Site I	All (90% in level 1)	
Dama sp.	3	Site I	Level 1	Antler and teeth
Praemegaceros sp.	2	Site I	Level 1	
Praeulces sp.	1	Site I		Antler frag
Capreolus sussnbornensis	4	Site I	Level 1	
Sus scrofa sp.	3	Site I		
Hippopotamus antiquus	1	Site I		Calf tooth frag
Equus (equus) mosbachensis	920	Site I (some Site III)	Mostly levels 4 & 5	Natural age distribution but v fragmented
Equus (allohippus) sp. Indet.	3molars	Site I	Level 1	
	287		Level 1	
	3		Level 2	
	9		Level 3	
	28		Level 4-5	
	5	Site III		
Proboscidea indet.	1	Site I	Level 1	
	2 tooth		Level 1	
	3 phalange		Level 5	
Gulo schlosseri	1 mandible	Site I	Level 5	
Meles meles atavus	1	Site I		
Ursus derninggeri	120	Site I		
Ursus (ursukus) stehlini	molars	Site I	Level 1	
Canis strandi	Molars & mandible	Site I	Level 1	
	9		Level 1	
	3		Level 3	
	9		Level 4-5	
Trogontherium schmerlingi	43	Site I	Level 1	
Castor fiber ssp. Indet.	79	Site I	Levels 1, 3 & 4	
Macaca sylvana	1 molar	Site I		

Table 4.2 Fauna and quantities of bone fragments recoverd from archaeological contexts at Vértesszőlős (after Kretzoi 1990)

The Raw Material

The stone utilised by the hominins at Vértesszőlős has traditionally been believed to have been sourced from the local river gravels. These consist of small pebbles derived from the Oligocene, Eocene and Mesozoic sediments of the adjacent Vértes Mountains and include pebbles of a range of different raw material types: limestone, dolomite, quartz, quartzite, flint, radiolarites and shale (Kretzoi & Dobosi 1990). Material would also have been available from the terraces of the Átalér, where pebbles of 20-30mm are found in the sediment (Pésci 1990). It is the small size of this raw material that it is believed has influenced the ‘microlithic’ nature of the Vértesszőlős industry: the average artefact size is just 24mm (Vertes 1990).

Due to the proximity and availability of the alluvial gravels, previous studies have focused on the origins of the diverse clasts and pebbles making up these deposits. However, the gravels are not the only raw materials available in the area. In addition to the small gravel clasts available along the banks and terrace deposits of the Átalér River, the limestone bedrock in the area would also have provided a potential source of larger raw material. Personal observation of the surrounding area has also identified a number of locations in the hills behind the site where large pieces (>250mm) of red radiolarite are weathering out of the limestone bedrock, particularly around the base of trees. The radiolarite is an extremely fine grained material, excellent for knapping and at source occurs in large blocks embedded in the limestone bedrock. A number of other sources of radiolarite (in particular in a dark red and in a green colour) are also known from further afield (András Markó, Hungarian National Museum, pers. comm.) and the possibility of bringing in material from these distant sources cannot be ruled out (see text box 4.1). Text box 4.1 presents the argument in detail for the presence of a larger raw material source based upon my data.

Raw material	Cortex		
	yes	no	
Red radiolarite	75 (52.8%)	67 (47.2%)	142
Other flint	199 (65.7%)	104 (34.3%)	303
Limestone	55 (63.2%)	32 (36.8%)	87
Quartzite	379 (91.5%)	35 (8.5%)	414
Quartz	4 (100%)	0	4
Other	14 (82.4%)	3 (7.6%)	17
TOTAL	726 (75.1%)	241 (24.9%)	967

Table 4.3. Numbers and percentages of artefacts with and without cortex for different raw material groups.

Further evidence establishes the distinct possibility that sources providing larger pieces of fine grained radiolarite may have been exploited when we look more closely at the lithic artefacts themselves. Klára Varga-Máthé notes in her analysis of the assemblage (Varga-Màthè 1990) that artefacts manufactured from the red radiolarite material appear to be more numerous than the percentage of red radiolarite naturally occurring in the river gravels, suggesting that the hominins may have been deliberately targeting this raw material, either selecting pebbles or from primary sources.

The possibility of larger raw material: the flakes

1. All the raw materials have pebble cortex
2. All the fluvial pebbles are c.2-3cm
3. Experimental knapping shows a high frequency of cortex (Toth types 1-5) for *in situ* knapping.
4. However, the pattern observed for the archaeological flint-like raw material flakes displays a high percentage of Toth type 6 (figure 4.9).
5. The pattern observed for the quartzite flakes also displays a high number of flakes with cortex, matching the pattern expected from the experimental data.
6. **Therefore the quartzite appears to have been knapped *in-situ* while the flint-like assemblage does not.**
    a. All the flint like flakes including the red radiolarite are of a similar size.
    b. All the flint like flakes have lower than expected incidents of cortex
    c. This pattern is even more pronounced when the red radiolarite artefacts are separated out
    d. There is very little size difference between the two (<4mm)
    e. This leaves three possible interpretations for the flint-like raw material:
        i. The flint-like flakes were not knapped from river pebbles
        ii. The entire *chaine operatoire* is not present for the red radiolarite
        iii. Both the above are true.
    f. Can the above be falsified?
        i. All the cortex observed is river pebble cortex
        Some of the flint-like artefacts were knapped from river pebbles
        ii. Number 6.e.ii can be tested, and it is clear the entire reduction sequence is not present.
        iii. I therefore interpret this to mean that previously flaked cores of the red radiolarite must have been brought into the site for further reduction and the nodules from which these pre-knapped cores were originally worked must have originally been bigger to enable them to be reduce to their current size (given 6c and 6d)

Therefore it is my interpretation that a larger raw material than the river pebbles was knapped at the site.

Text box 4.1 – the argument for the use of larger raw material at Vértesszőlős

Figure 4.8 An example of a radiolarite seam embedded in limestone bedrock, near Tata, Hungary. (photo J. McNabb)

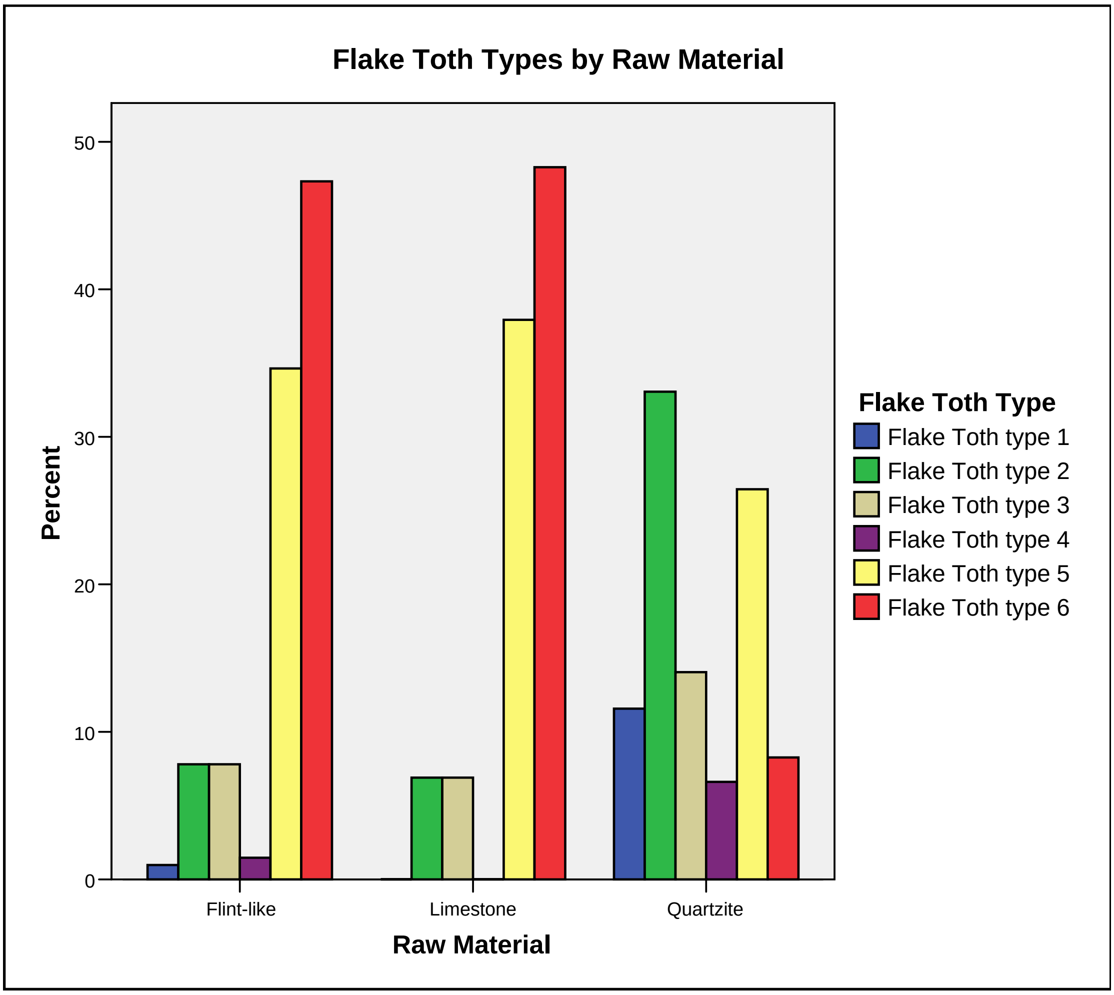

Figure 4.9. Graph showing the numbers of flakes in each Toth type for all categories of raw material. NB Flint-like includes radiolarite.

The Assemblage

In terms of lithic assemblage there is little difference between the archaeological levels in Area I ((Kretzoi and Dobosi 1990) and personal observation), although Vértes did note that there appears to be a slight increase in the proportion of flake tools and a decrease in pebble tools from the lowest to the upper levels (Vértes 1990). However, the difference in assemblage size may distort these patterns (see table 4.1). For the purposes of this research only the lowermost archaeological level, Level 1, was studied, as it represents the richest archaeological level identified at the site.

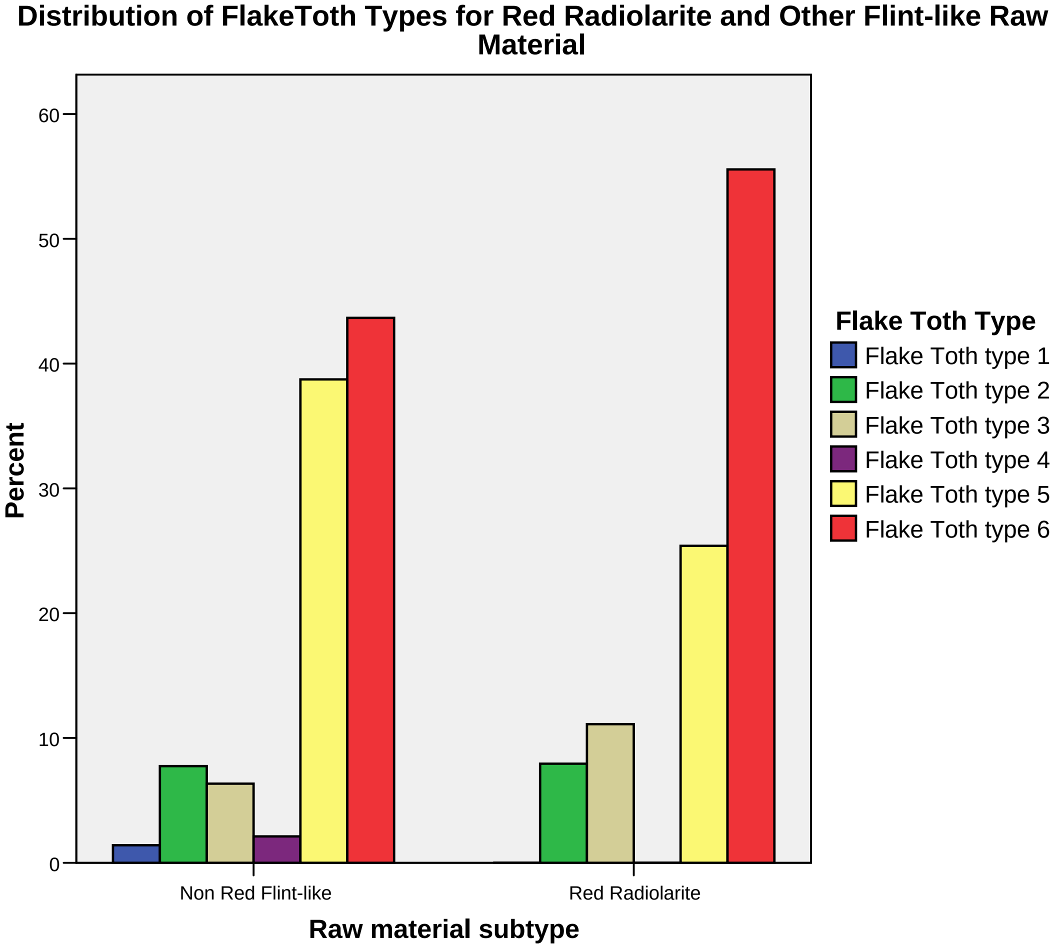

Figure 4.10. Distribution of flake Toth-types for flint like raw material separating the red and the other flint-like raw material. Note the higher percentage of Toth type 6 (no cortex)

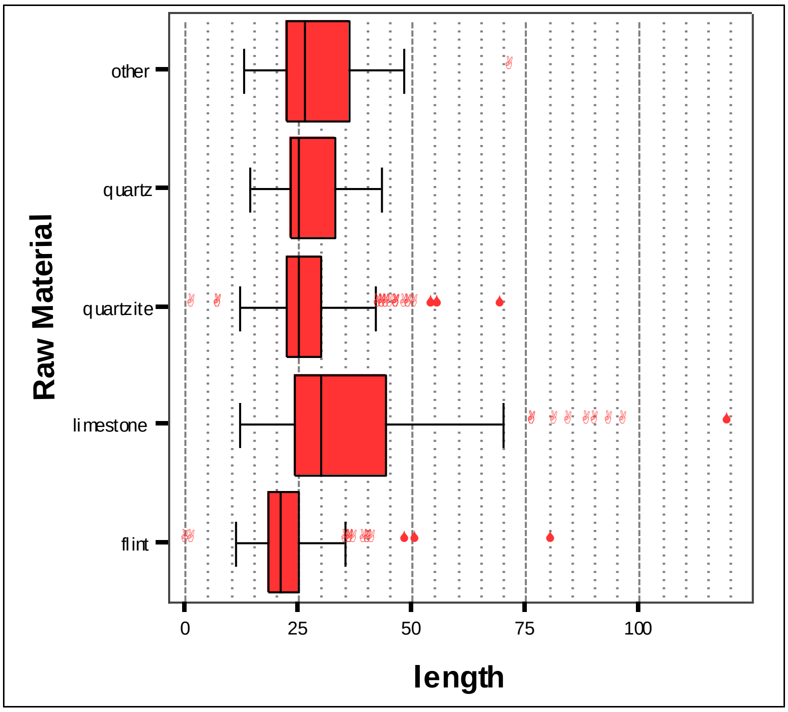

Figure 4.11. Boxplot showing the distribution of artefact lengths according to raw material. N.B. the radiolarite is included in the 'Flint' category here.

During the initial assessment of the assemblage, it quickly became apparent that a large number of the artefacts were not necessarily anthropic (see figure 4.11). Therefore, given the huge size of the assemblage and the short time frame available for analysis, boxes marked as containing tools, flakes or cores were targeted. In addition a portion of the material from the other boxes was also analysed. In all a total of 1928 artefacts were analysed from a possible 3163. Of those 1928 artefacts analysed, 949 (49.2%) were fragments which were not necessarily the products of hominin knapping (see figure 4.12). The observation in the site report (Kretzoi and Dobosi 1990) that the site was excavated using dynamite may have something to do with this! However despite this the vast majority of the genuine artefacts are in extremely fresh condition.

A note on typology

A recurring theme in the analysis of the European NBAs, and indeed the NBAs of other regions, is the problem of typology as discussed in the Methodology chapter. László Vértes discusses the problems he had trying to establish a suitable technique to analyse the lithic artefacts of Vértesszőlős (Vertes 1990). The system used is based upon a range of pebble tool typologies in use at the time, in particular those of van Riet Lowe, Ramendo and Movius (Movius 1944; Ramendo 1963; Riet Lowe 1952). Vértes notes in his discussion of the typological challenges posed by the Vértesszőlős assemblage that it is unusual amongst pebble tool industries in having a significant flake tool element (he cites 50%). The system he developed is extremely detailed and therefore very complex with each artefact given a code according to their basic type, form, retouch, and size and the analysis itself is clearly influenced by the statistical approach developed by Francois Bordes. While the analysis of the assemblage is extremely detailed, the original nature of the typology makes it virtually impossible to undertake any meaningful technological comparison. It is for this reason that my much simpler technological methodology was implemented for the assemblage analysis undertaken for this study. While simple it has the advantage of not making a judgement between pebble tools and flake tools as dominant elements of the assemblage, but rather focussing more on the flaking strategies in the production of these artefacts.

Text Box 4.2 Typology and Vértesszőlős

Figure 4.12. An example of the content of the boxes – some of these fragments could not be distinguished from naturally broken pebbles. (photo H. Fluck)

The Vértesszőlős assemblage has been presented as a micro-chopper industry dominated by core tools. While no distinction was made between cores and core-tools, both were recorded as flaked pieces, it is clear that the assemblage is not dominated by flaked pieces with flakes and flaked pieces making up almost equal proportion of the assemblage (Table 4.4). The debris consists of fragments that may or may not be anthropic. Vértes argued that all the material present on the site must have been brought there by hominins, however, the presence of such a large quantity of questionably anthropic material in the assemblage does raise the possibility that there may be taphonomic processes at work which have not been fully understood.

	Quarzite		Flint-like		Limestone		Other		TOTAL	
	N	%	N	%	N	%	N	%	N	%
Flaked pieces	197	19	144	23.6	33	14.5	9	22	383	20
Flakes (incl. broken)	157	15.1	199	32.6	40	17.5	10	24.3	406	21.2
Retouched tools	59	5.7	101	16.5	15	6.6	2	4.9	177	9.2
Debris	625	60.2	167	27.3	139	61	18	43.9	949	49.4
Hammerstones & modified natural	1	0.1	-	-	1	0.4	2	4.9	4	0.2
TOTAL	1039		611		228		41		1919	
	54.1%		31.8%		11.9%		2.1%		100%	

Table 4.4: Artefact types and raw material from Vértesszőlős I, Level I.

The assemblage is famous for the small size of the artefacts – the majority are less than 25mm long (see Figure 4.13). Clearly this is influenced to a large extent by the raw material being used - mostly river pebbles of quartzite and flint-like material from the Átalér alluvial gravels. However, as argued in the text box, it is possible to infer that other larger sized flint like material, in particular the red flint-like radiolarite, was also being exploited. The lithics in all raw materials are strikingly small (see figure 4.11) and the retouched pieces are also of a similarly small size (see table 4.5); in fact artefacts that are of a size that might be dismissed as being debris in other assemblages (e.g. see the criteria of McNabb (2007) and those employed by Fernadez Peris (2007) and Molines (1999)) here make up the bulk of the assemblage. The size of the lithics in the assemblage presents a conundrum: while it is clear that to a certain extent the artefacts are limited in size due to the use of small raw material from the gravels of the Ataler, the use of larger material raises the possibility that there was a certain amount of choice in the size of the artefacts discarded at the site.

	Length (mm)					
	Mean	**Min**	**Max**	**Range**	**St Dev**	**Count**
Flaked pieces	25.5	11	77	66	7.61	384
Flakes	22.8	13	53	40	6.25	406
Retouched pieces	24.7	15	50	35	6.17	177
Hammerstones and modified natural	47.07	28	120	92	24.14	14

Table 4.5: Length of different artefact types for Vértesszölös I, Level I.

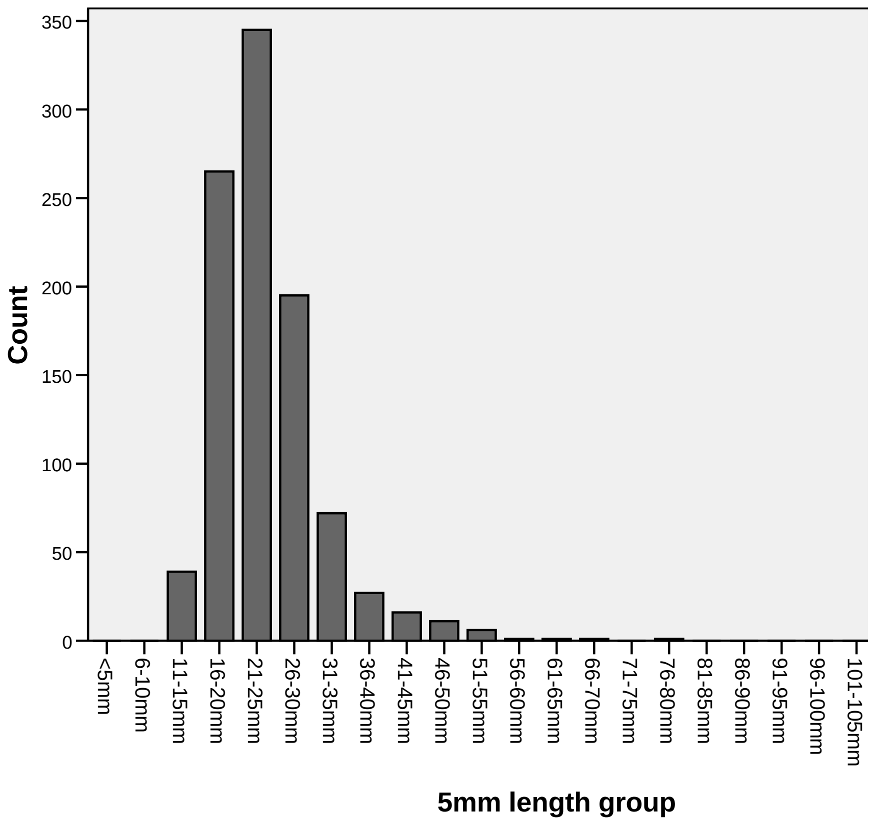

Figure 4.13. Chart showing the distribution of artefact lengths for all raw materials and artefact groups from table 2. Debris not included.

It is possible that the material found at Vértesszőlős I represents material discarded as no longer useable: exhausted cores, broken tools, flakes too small to be reworked. The relatively low incidents of flake scars (see figure 4.14 and 4.15) would appear to contradict this possibility. However, some 249 cores (64.5%) were observed to be either exhausted or in the latter stages of exploitation compared to 137 which were in the initial stages of exploitation – the relationship between flake scars and exploitation is not a straightforward one. Nevertheless, at the risk of present a circular argument, the small size of the artefacts alone makes it difficult to see how the material at the site could have been further exploited.

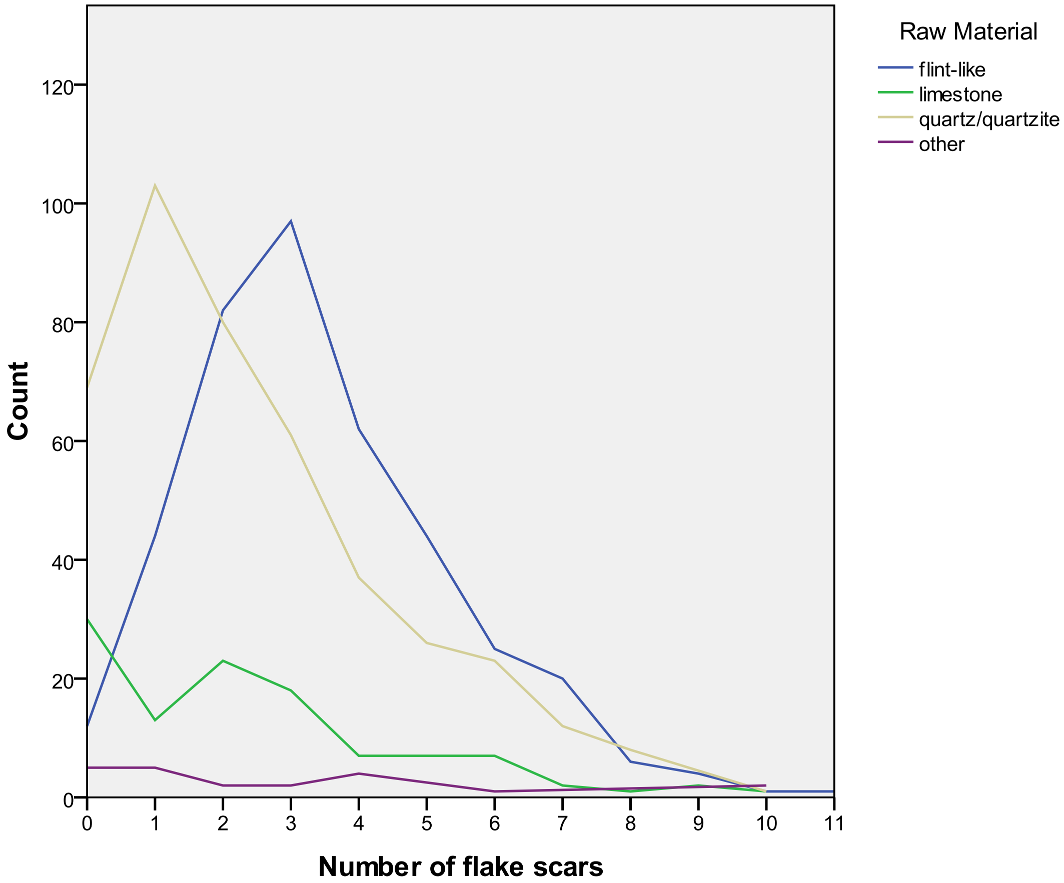

Figure 4.14: Graph showing the number of flake scars by raw material

The flaked pieces are simple, unprepared cores, almost half of which display flaking around a fixed perimeter (Figure 4.16), and many of those which do not display this, are flaked pieces with single removals. The flaking is dominated by alternate flaking, as might be expected for knapping around a fixed perimeter. However, there is some variation in core flaking techniques which vary between the raw materials (see Table 4.6). A large number (31.1%) of the quartzite flaked pieces have been knapped with single removals (this can mean more than one removal from the core), over double the percentage seen for the other raw materials (flint-like 10.5% and limestone 15.2%). The high numbers of single scar removals on the quartzite pebbles is probably a symptom of the small size of the raw material. The possibility of larger raw material in the flint-like and limestone categories has already been highlighted and the flaking strategy would appear to reflect this, although it may also reflect a preference for the flint-like raw material. Overall alternate flaking is the dominant approach either in isolation or in combination with parallel flaking making up 47.1% of the assemblage. Interestingly, despite the small size and the dominance of pebbles in the assemblage, there is little evidence for bipolar technique, by which I mean splitting the pebble by resting one end on an anvil and striking the other, which might have been an obvious way of getting into small raw material and creating easy flaking platforms. This might support Vértes' original hypothesis that the cores are in fact largely core tools – flaking creates a more acute angle and arguably a more useable edge than a split pebble. However, the dominance of single scars for quartzite suggests that raw materials were worked by different techniques, even when factors such as size are the same. Possibly the nature of the flake or edge required influenced the knapping strategy?

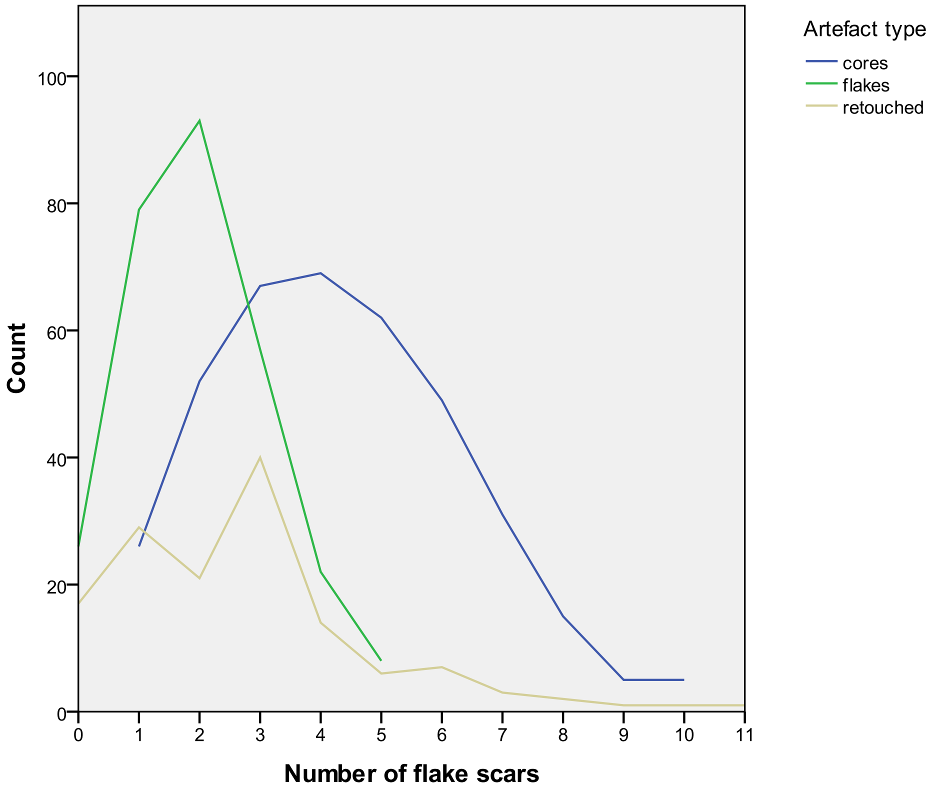

Figure 4.15: Graph showing the number of flake scars by artefact type

When we look at the retouched tools we do find a number made on flaked pieces and broken chunks (15.8%) but retouched flakes make up the majority of the tools (84.2%) (see table 4.6). The fine grained flint-like material was favoured for retouching with 57.1% of the retouched tools made on this material (see table 4.7) despite it making up only 31% of the total assemblage.

	Flint-like		Limestone		Quartzite		Other		TOTAL	
	N	%	N	%	N	%	N	%	N	%
Alternate flaking	33	21.6	7	21.2	42	21.4	2	25	84	21.5
Alternate & parallel flaking	52	34	9	27.3	38	19.4	1	12.5	100	25.6
Parallel flaking	19	12.4	6	18.2	29	14.8	3	37.5	57	14.6
Single removals	16	10.5	5	15.2	61	31.1	1	12.5	83	21.3
Mixed techniques	32	20.9	6	18.2	25	12.8	1	12.5	64	16.4
Other non PCT	1	0.7	-	-	-	-	-	-	1	0.3
Centrepetal alternate flaking	-	-	-	-	1	0.5	-	-	1	0.3
TOTAL	153		33		196		8		390	

Table 4.6: type of flaking strategy by raw material

There are a number of possible explanations for this, not necessarily mutually exclusive: firstly, the fine-grained material was deliberately selected for retouching as it was easier to work; secondly, retouch is easier to identify on the finer-grained pieces; thirdly, the finer-grained material was available in larger sizes, making it more suitable to knap to produce the flakes which formed the blanks for the majority of the retouched tools. This would contrast with the smaller quartzite pebbles which were more suited to the manufacture of core tools rather than flakes. This third possibility is supported by the greater percentage of flaked pieces found in quartzite than in flint-like material and conversely the greater percentage of flakes found in flint-like material (see Table 4.4).

The retouched tools are dominated by scrapers which make up nearly half of the total retouched assemblage (see table 4.7). Denticulates also feature prominently (14.7%) and interestingly the proportion of denticulates is greater in the flint-like raw material than the quartzite. Tools with multiple areas of retouch and those with non-diagnostic retouch also make up a significant element of the retouched assemblage, and again were more frequent in the finer-grained flint-like material. It has been argued that denticulate forms and multiple tools occur as edges on older tools are reworked (e.g. Dibble *et al*. 2006) and this pattern of retouch observed for the Vértesszőlős I assemblage is another indication that the flint-like raw material was more intensively exploited than other raw materials.

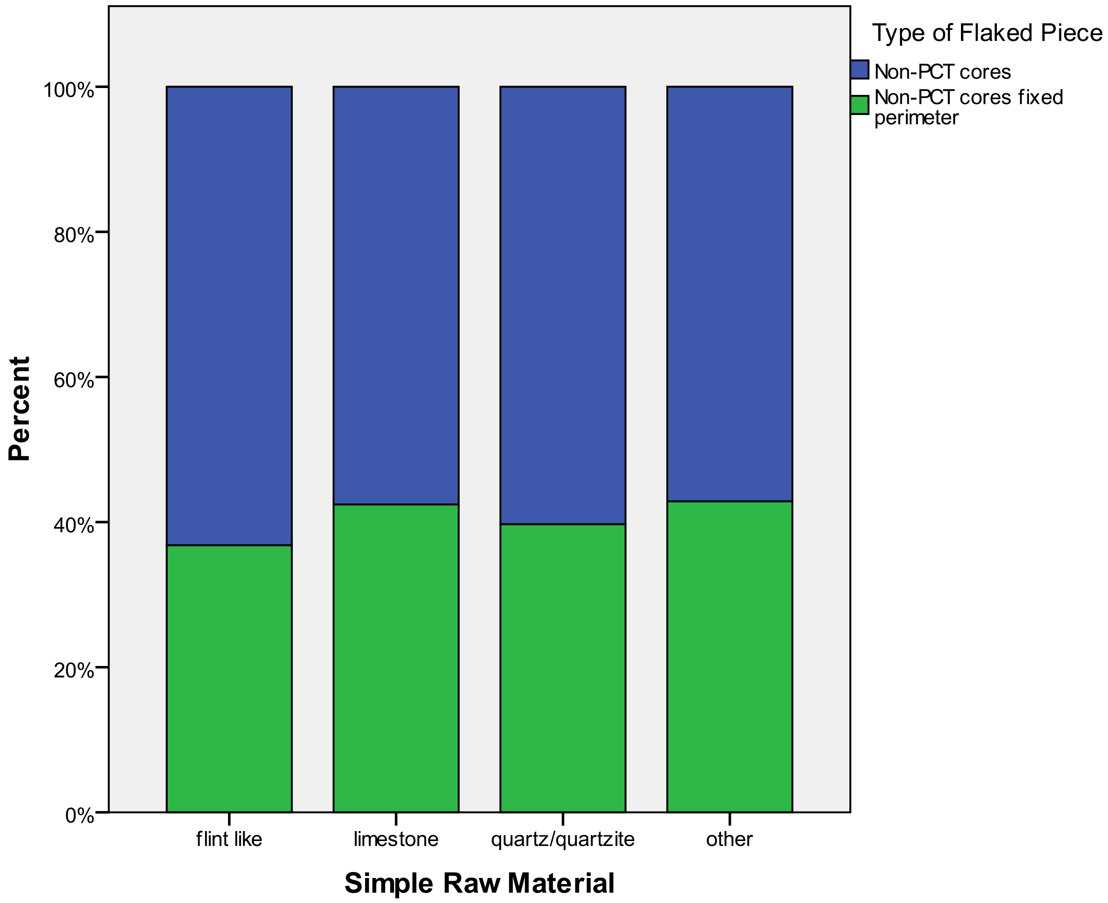

Figure 4.16: types of flaked piece by raw material

Overall from the *lack of any clear types* it appears that it was the edges that were important to the Vértesszőlős hominins more than the forms of the tools they were making. Interestingly, the bifacially worked points so characteristic of Bilzingsleben and Schöningen, and possibly indicative of a hafted technology (see previous section), are absent. There are two pieces with convergent retouch but these are thick and unsuitable for hafting – quite different from the convergent pieces from the German sites.

In summary, the Vértesszölös assemblage is characterised by: the small size of artefacts; a use of a variety of raw material types, in particular very local quartzite, and a range of fine-grained flint-like materials; simple, unprepared core technology with a slight preference for alternate knapping around a fixed perimeter; unstandardised retouched tools on both flakes and flaked pieces dominated by scrapers, but with a considerable element of denticulates, multiple tools and undiagnostic pieces. The quartzite pebbles were knapped *in situ*, as was some of the flint-like raw material; importantly, though, there is evidence that at least some of the better-quality flint-like raw material (red radiolarite) was brought into the site already knapped. The core flaking strategies appear to show an opportunistic production of sharp edges on flakes or flaked pieces rather than strategies aimed at maximising the size of flakes. There is also no evidence for the manufacture or reworking of larger artefacts, such as handaxes, at the site. While the exploitation of the small local gravel pebbles dominated the raw material there is evidence that larger raw material was also exploited, some of it possibly imported and as such it appears that the Vértesszőlős hominins were choosing to *discard* small artefacts here. Whether they were choosing to make small artefacts is less clear, but given the absence of evidence for manufacture of any larger artefacts and apparent access to and use of larger raw material we must conclude that this is the case.

Retouched pieces made on:	**Flint-like N**	**%**	**Limestone N**	**%**	**Quartzite N**	**%**	**Other N**	**%**	**TOTAL N**	**%**
Flaked pieces	14	*13.9*	1	*6.7*	1	*1.7*	-		16	*9*
Chunks	1	*1*			4	*.8*	-		5	*2.8*
Core fragments	4	*4*	1	*6.7*	2	*3.4*	-		7	*4*
Flake cortical butt (Toth 1-3)	15	*14.9*	2	*13.3*	18	30.5	-		35	*19.8*
Flake non-cortical butt some cortex (Toth 4-5)	22	*21.8*	1	*6.7*	16	*27.1*	1	*50*	40	*22.6*
Flake no cortex (Toth 6)	18	17.8	4	*26.7*	3	*5.2*	-		25	*14.1*
Broken hard hammer flake	27	26.7	6	*40*	15	*25.4*	1	*50*	49	*27.7*
TOTAL	101		15		59		2		177	

Table 4.7: the distribution of types of artefacts that have been retouched at Vértesszőlős I

The small size of the artefacts, lack of standardisation in the retouched tools and the high degree of denticulates and multiple tools, types often associated with reworking or pre-existing artefacts, suggest to me an intensive reusing of material, possibly even reworking of material that had been discarded at the site by previous occupants. One possibility is that the site at Vértesszőlős was used for short periods of time by highly-mobile hominins who needed to conserve resources of quality knapping material, and therefore discarded only the more heavily exploited or poorer-quality material.

It is interesting that while there may be superficial similarities between the Vértesszőlős assemblages and those from Trzebnica and Rusko in terms of size and retouched tool types (the dominance of scrapers and significant number of denticulates), in other regards the assemblages are quite different. The near absence of flaked pieces at Rusko and Trzebnica in particular contrasts with the high proportion of flaked pieces and the absence of points and bifacially worked artefacts in the Vértesszőlős assemblage. Vértesszőlős appears to be quite unique amongst the microlithic NBAs of central Europe.

	Flint-like N	%	Limestone N	%	Quartzite N	%	Other N	%	TOTAL N	%
Scraper	41	*40.6*	5	*33.3*	40	*67.8*	-		86	*48.6*
End scraper	3	3	-		2	*3.4*	-		5	*2.8*
Denticulate	15	*14.9*	6	*40*	4	6.8	1	*50*	26	*14.7*
Retouched notch	8	*7.9*	2	*13.3*	2	*3.4*	-		12	*6.8*
Point/convergent retouch	1	*1*	-		1	*1.7*	-		2	*1.1*
Flaked flake/spall	4	*4*	1	*6.7*	4	6.8	-		9	*5.1*
Multiple	11	10.9	-		5	*8.5*	-		16	*9*
Non-diagnostic	18	*17.8*	1	*6.7*	1	*1.7*	1	*50*	21	*11.9*
TOTAL	101		15		59		2		177	

Table 4.8: Types of retouched pieces from Vértesszölös I by raw material

By revisiting first hand the assemblage from Vértesszőlős I believe that the assemblages are the result of the hominin occupation of travertine basins associated with springs, possibly thermal. There are several penecontemporaneous archaeological locations with NBA s and the repeated NBAs in different stratigraphic layers at the same location indicated the repeated manufacture of NBAs possibly over millennia at the same site. The dating of the site remains problematic but estimates range from MIS13 to MIS9. The assemblage itself is characterised by a very small artefact size which is not necessarily restricted by raw material but probably influenced by predominance of small gravel pebbles. Bifaces and their manufacture are absent and the knapping appears to be focussed on useable edges rather than tool form. The assemblage is unstandardised with retouched tools dominated by scrapers with large number of denticulates. The knapping is dominated by alternate flaking and the cores are simple with no evidence for core preparation techniques.

Trzebenica and Rusko

There are a number of more promising sites with genuine assemblages in Poland; however, for many of these dating remains a serious problem. There are particularly interesting sites emerging from the area of Silesia, Southern Poland. Three sites have been identified to date with assemblages consisting of small-sized artefacts and a notable absence of handaxes (Burdukiewicz 2003). Trzebnica 2 has been broadly dated to MIS 13 (Burdukiewicz 2003) based upon its geological context although currently no radiometric dates have been published. The site has a large assemblage from two archaeological horizons, although the upper one consists of only c. 200 artefacts, and handaxes are reported to be entirely absent. Both assemblages are dominated by flakes (>80%) and flake tools (c. 10%) with very few flaked pieces (c.3%) (Burdukiewicz 2003). The retouched tools are predominantly scrapers, followed by denticulates and retouched notches. The artefacts from the upper and lower archaeological horizons are very similar. The lower archaeological horizon consists of artefacts and faunal remains which appear to have accumulated during the Maloponian Interglacial (correlated to MIS13 or 15). The Maloponian deposits in places were up to 50m thick. Although limited, the associated fauna consisted of forested and open environment species such as red deer, bison, wild pig, horse and rhino. The upper archaeological horizon was recovered from deposits that appear to be of Mazovian age, that is post-dating the Sanian Glaciation (Elsterian (Ber 2006)), and are believed to have been accumulated in a temperate environment. Nearby two assemblages, stratigraphically correlated have been identified: Rusko 33 and Rusko 42. At Rusko 33, c.350 artefacts have been recovered with a tooth of a large herbivore, whereas at Rusko 42 some 3700 lithics have been excavated along with a single pike tooth (Burdukiewicz 2003). Both assemblages were found in sandy sediment associated with flowing water from a small slow flowing river or stream. At both locations, deposits associated with the Odranian glaciation covered those containing the archaeological horizon, this glaciation has been correlated with the Drenthe glaciation (possibly MIS8, see Appendix 1). Like the assemblages from Trzebnica, the artefacts from Rusko are small – typically between 10 and 25mm. Interestingly, it is reported that the raw material did not present any size restrictions, that is there is apparently larger raw material available nearby but the hominins at the site were apparently choosing to make smaller tools (unlike the situation reported in the literature for Vértesszőlős – where they are supposed to have had little choice) and yet the assemblage is described as microlithic, with comparisons made with Bilzingsleben (Burdukiewicz 1993, 2003). The excavators conclude that such artefacts are unusable unless hafted and there are a number of bifacially thinned pieces.

Summary:

Rusko 33 and 42 are two localities with broadly contemporary assemblages at interglacial riverside locations provisionally dated to MIS9. Nearly 400 artefacts have been recovered, mostly flakes measuring less than 25mm. Bifaces are absent and the retouched tools are dominated by scrapers. The excavators report that there are no raw material size limitations – raw material suitable for making larger artefacts was available.

Trzebnica 2 consists of two archaeological horizons at one locality. The upper horizon has c. 200 artefacts, and probably dates to MIS9 while the lower horizon has thousands of artefacts and is estimated to date to MIS13-11. Both assemblages are from a waterside locality in a temperate open forest environment. Bifaces are entirely absent, and the assemblage contains over 80% flakes. The retouched tools are dominated by scrapers. The artefacts are small, typically <25mm although again there are reportedly no raw material size limitations.

Bilzingsleben and Schöningen

There is a concentration of sites from modern Germany that are of particular importance in this region. One, frequently cited as an example of the microlithic Lower Palaeolithic industries of central Europe, is the famous site of Bilzingsleben. While comparisons have been drawn between this assemblage and other NBAs in this region (e.g. Burdukiewicz 1993, 2003; Svoboda 1987), I do not consider Bilzingsleben to be an NBA for a number of reasons. Firstly, handaxes are reported from the site, manufactured on bone (see figure 4.19), so although larger raw material may not have been available these people were clearly capable of, and did, make handaxes. It should be noted though that the validity of these handaxes has been questioned. Secondly, although small, many of the bifacially worked points are technologically bifaces: if found scaled up on any number of European Lower Palaeolithic sites they would be undoubtedly be described as bifaces (e.g. see fig.5, page 93 of Mania 1995 and figure 4.20). The presence of these points and bifacial working of bone and stone makes these assemblages quite different from the traditional NBA concept which has tended to emphasise a technologically simple assemblage consisting of flakes, cores and chopping tools. In particular the presence of these artefact types makes these assemblages quite different from the Clactonian assemblages described in the previous chapter. Nevertheless with a potential date of MIS 11 (Schreve and Bridgland 2002) their broad contemporaneity and lack of classic handaxes urges consideration in this discussion.

		Schöningen channel	Sch site	Site details	Fauna	Lithics
		Schöningen II, level 5				
		Schöningen II, level 4				
	Boreal, cool to temperate grass & forest steppe	Schöningen II, level 4	Sch 13 II-4	Discovered 1994 in organic mud. Some evidence of burnt sediment suggestive of fire.	>25,000 faunal remains; horse (>90%) (*Equus mosbachensis*), butchery evidence	Flint assemblage: scrapers, points & c.1200 retouch chips. Blank production waste absent. Wooden tools (spruce): throwing stick, 6 spears (1 pine), & other wooden artefacts incl. forked branch with charred ends – pos. a spit.
		Schöningen II, Level 2	Sch12, l. 2	2-3m higher than Schöningen 12. 30m² excavated	large mammals	some flint artefacts
	Early/max interglacial w/ thermophilic molluscs	Schöningen II, Level 1	Sch 12	Discovered 1992. 150 m² excavated in 3 months. Lakeshore deposits. Correlated w/ Bilzingsleben *Homo erectus* site from microfauna.	>1000 bones, Palaeoloxodon antiquus fauna: Straight tusked elephant, rhino (Stephanorhinus kirchbergensis), horse (Equus mosbachensis), cave bear (Ursus spaeleus, Ursus tibethanicus), red deer (Cervus elaphus), roe deer (Capreolus capreolus), aurochs (Bos primigenius), wild boar (Sus scrofa) & other incl fish & small mammals.	All artefacts flint from local Elsterian sediments: denticulated tools, notched and pointed tools and a small handaxe like tool. Wooden artefact in silver fir (*Abies alba*): 3 broken with groove in one end, 1 has groove in both ends.
Holstenian G						
Holstenian IG		Schöningen I	Sch13 I	Oldest Schöningen site 400kyr (TL). Lakeshore site, 120 m² excavated 1994.	Steppe elephant (*Mammuthus trogontherii),* bovids, horse and red deer	Flint artefacts: small flakes, notched flake tools & burnt flint
Elster G						

Table 4.9: Details of the Schöningen Palaeolithic sites excavated to date.

The site of Schöningen is another significant German location in the discussion of European NBAs. Often discussed as a single site, Schöningen actually consists of a number of archaeological sites, dating from the Lower Palaeolithic through to the Iron Age, within a brown-coal mine spanning several square kilometres. There are in fact three Lower Palaeolithic sites that have been identified and excavated to date (see table 4.9) and some of these have a number of archaeological horizons. There are strong similarities between this assemblage and that of Bilzingsleben and the geological context of the two sites has been correlated suggesting that there may be broadly contemporaneous archaeological horizons from the two sites. Most famously, the excavations of the Lower Palaeolithic assemblages at Schöningen have revealed a number of wooden artefacts, including six spears in spruce and pine. One of the horizons has also yielded curious grooved wooden artefacts interpreted by the excavators as cleft-haftings for the small stone tools. For the excavators the small size of the lithics at the site is because these artefacts were in fact components of the earliest examples of composite tools, although the small and frost fractured nature of the raw material is acknowledged (Thieme 2003). The close similarities with Bilzingsleben and descriptions of bifacially worked points (see figure 4.21) suggest that this site too may not be a true NBA. However work is ongoing and as yet there is no comprehensive publication of the lithic assemblages, so it is difficult to make a comparison in this study. Given the nature of the wooden artefacts the hafting argument is a compelling one.

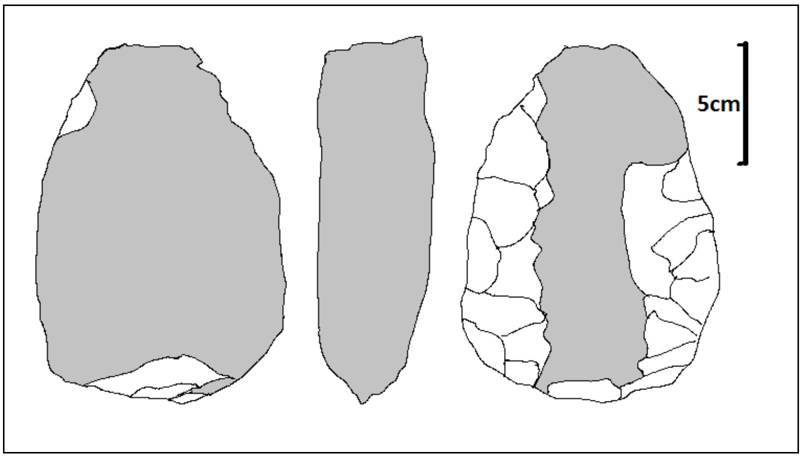

Figure 4.19. Handaxe from Bilzingsleben on bone (Drawn by H. Fluck after Brühl 2003)

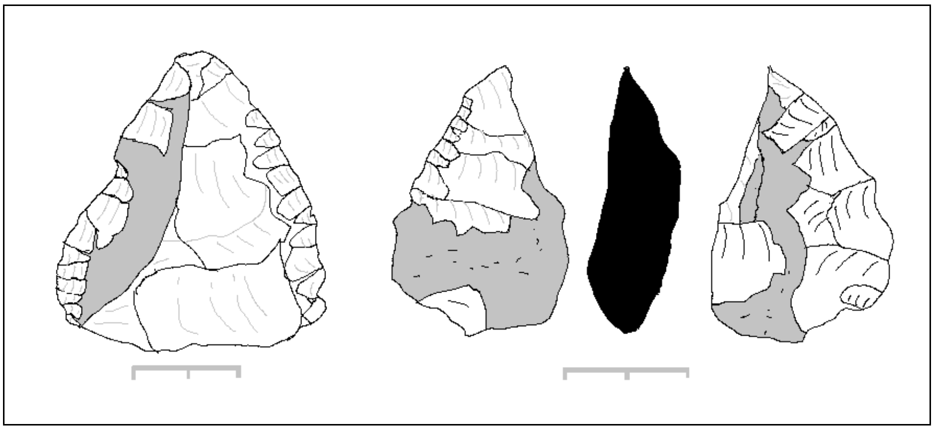

Figure 4.20. Points from Bilzingsleben (after Brühl 2003: 55)

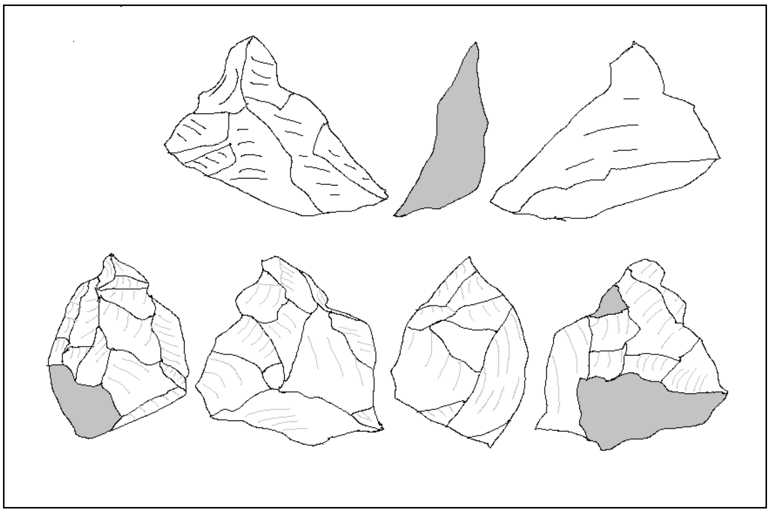

Figure 4.21. Points from Schöningen. (after Thieme 2003: 16)

Conclusions

It is difficult to distinguish between the paucity of Middle Pleistocene sites in this region and the paucity of bifaces. Claims for a microlithic 'culture' in the central European region focused on Vértesszőlős are premature. On closer inspection many of these sites do not stand up to scrutiny and such generalisations cannot be made on the basis of a few undated isolated finds. Further fieldwork in this region could greatly increase the number of sites. Although the presence of bifacially worked pieces means that Schoningen, Bilzingsleben, Rusko and Trzebnica are not NBAs they cannot be classed as traditional Acheulean sites. The hominins at these sites seem to have found a different technological solution consiting of small, hafted tools. At Vértesszőlős the bifacial elements are absent and although small, the artefacts are too thick to be suitable for hafting. Unfortunately many of these sites have yet to be securely dated with estimates ranging from MIS15 through to MIS9, or even more recent.

Comparison with the Clactonian

The similarities between the Clactonian and these central European assemblages are limited. The most striking difference is the size of the artefacts. The Clactonian is typified by large flakes, where as all these central European assemblages appear to be consistently small in size. While at Vértesszőlős the size may have, at least in part, been restricted by the raw material this does not appear to have been the case in Trzebnica or Rusko, where it appears that the hominins were deliberately making small artefacts – possibly for hafting as the excavators suggest. There are similarities in the simplicity and lack of standardisation in the retouched tool component of all these assemblages, however the flaked flakes so typical of the Clactonian assemblages are largely absent. Likewise the finer tools interpreted as elements of hafted, composite tools that are present at Rusko, Trzebnica, Schoningen and Bilzingsleben are not present in the Clactonian assemblages. More importantly, the presence of bifacial artefacts in the assemblages of this area, with the exception of Vértesszőlős, strongly contradicts any suggestion that this area may be a ‘homeland’ of the Clactonian.

Chapter Five

France

For much of the Pleistocene, France was separated from Britain by the Channel River, to the west it is bordered by the Atlantic and to the south the Pyrenees provide a substantial barrier with the Iberian peninsula until they give way in the south-east to the shores of the Mediterranean; in the east the mountains of the Alps form another distinctive geographical barrier.

There are also a number of key river systems which have played an important role in the location, preservation and discovery of many of the Palaeolithic sites; most famously the Somme valley with the handaxe rich sites of St. Acheul, the Cagny localities, and Abbeville (e.g. Tufreau *et al*. 1997) within its terrace system. Moving south, the River Seine and its tributary the Yonne have also yielded significant Middle Pleistocene discoveries, in particular the site of Soucy (see below) and at its mouth the Le Havre littoral sites (also discussed below). The Loire, and its tributaries the Vienne and Allier, has yielded fewer Pleistocene sites, although there are a number of interesting localities in its upper reaches such as Soleilhac, and Azé cave (see below). The rivers of the Perigord area are well known for their archaeology, and the Garonne, which meets the Dordogne at the coast, has been subject to a number of surveys (e.g. Jaubert and Servelle 1996; Tavoso 1986 for the Tarn). The only major river to break with the general east-west trend observed in those rivers discussed above is the Rhone and its tributaries the Saone, Gard, Durance and Verdon, which drain from the north, south into the Mediterranean. Like the Loire early sites in the upper part of the Rhone and Saone are rare but there have been interesting discoveries further south such as Curson and Orgnac (Moncel, Moigne and Combier 2005).

Palaeolithic research in France has enjoyed an extremely close relationship with that in neighbouring Britain, although one suspects that it was an element of competition which spurred on early British researchers to seek out their own sites to rival those of the Somme gravels and the Dordogne caves. This shared past means that comparisons have long been made between the assemblages of these two countries. While the shared terminology that resulted from this symbiotic relationship can be useful, there is also a lot of historical baggage which might cloud attempts at reinterpretation. For many researchers France is the home of the Palaeolithic. Sites have been studied here since the origin of the subject. There are a huge number of Palaeolithic sites and a plethora of interpretations. The names of many of these sites 'La Micoque', 'Le Moustier', have become synonymous with the typologies and artefacts they gave their name to. French Palaeolithic research has led the way in lithic analysis and typology; the work of Francois Bordes (e.g. Bordes 1953), perhaps France's most famous Palaeolithic researcher, is known throughout the world and his famous typology is used almost as widely.

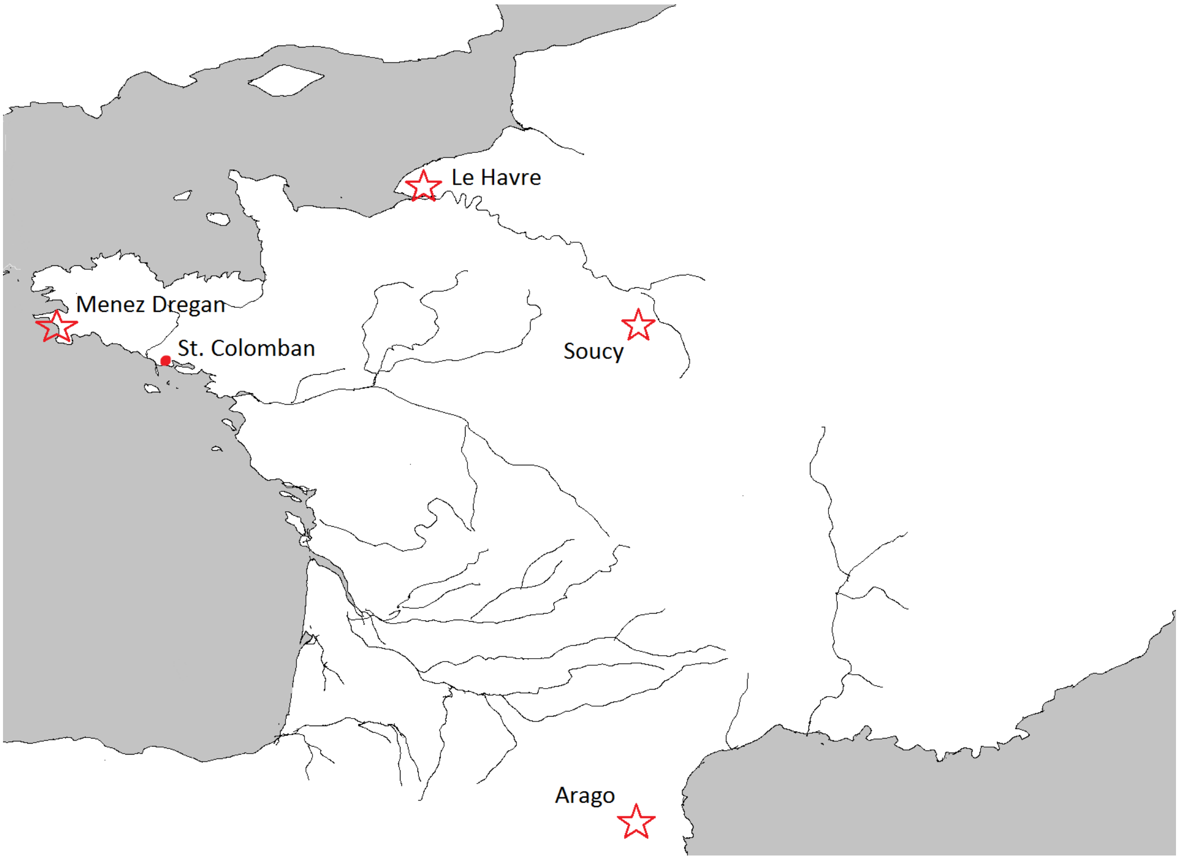

Figure 5.1: Map showing location of NBA sites in France.

Alongside a traditional emphasis on artefact-based research and typology, there has also been a longstanding underlying tendency toward *in situ* explanations for change, in contrast to the UK. This has undoubtedly been enabled and encouraged by the presence of long stratigraphic sequences and more or less continuous occupation seen in the cave sites of the Dordogne and Pyrenees areas (e.g. Caune d'Arago, Le Moustier etc). While few of these sites contain Lower Palaeolithic levels, the approach that changes can be observed occurring regionally through time has been echoed elsewhere. Where the debate surrounding the uniqueness of the Clactonian in the UK has grumbled on, many French researchers have happily embraced variation in the Lower Palaeolithic record bringing it all under an 'Acheulean *sensu lato*' umbrella (e.g. Jaubert and Servelle 1996). Nevertheless, some interesting variations are reported from the Middle Pleistocene assemblages from France and the sheer quantity of research, as well as the proximity to the UK make this a key region in this study.

The Abbé Breuil identified a number of sites as Clactonian in France (Breuil 1932). Perhaps most famously the lower levels of La Micoque, which are discussed in more detail below, but also find spots from the Le Havre region in Normandy, also discussed further below. François Bordes later identified two distinct zones of Acheulean assemblages: the Meridional (southern) and the Septrional (northern). Despite challenges (Villa 1983) these are distinctions that persist today (e.g. Fernández Peris 2007; Molines 1999; Delpech et al 1995). The Septrional or northern Acheulean is characterised by 'typical' handaxes of the variety that would be familiar to British researchers, whilst the Meridional or southern Acheulean is characterised by a lack (or very low frequency) of handaxes and a greater proportion of flake tools which are seen as the beginnings of the evolution into the Mousterian. The Meridional Acheulean is also reported in the Iberian peninsula.

Brittany

Brittany had traditionally been a region with little Pleistocene archaeology where, apart from occasional isolated finds of handaxes, little was known in comparison with the Somme valley and the surrounding areas. Research over many years by archaeologists from the University of Rennes has resulted in a huge quantity of new information which has radically altered the way in which Middle Pleistocene archaeology is interpreted in northern France. The industry that has been identified is referred to as the 'Colombanien' and it is characterised by a lack of handaxes, the presence of pebble tools, and is a flake-based industry. Numerous assemblages that have been attributed to this technofacies have been identified at a number of locations throughout the region, e.g. Isle de Groix, Toulinet, and Plouharnel (Monnier 1996, and see gazetteer). The key sites associated with the Colombanien are discussed below.

The Colombanian

Work by Jean-Laurent Monnier in the north west of France, principally in Brittany, has identified a number of sites with assemblages where bifaces are rare or absent which he has labelled 'Colombanien' after the first of these sites to be identified (Monnier and Le Cloirec 1985, Monnier and Molines 1993). The main location for Colombanien assemblages, and the only one to contain *in situ* archaeological material, is Menez Dregan on the cliffs off Finistere in the far west of Brittany. During the course of this research the sites of both Menez Dregan and St Colomban were visited and lithic material from excavations at the sites studied.

St Colomban:

La Point de Saint-Colomban is located near the town of Carnac, on the Gulf of Morbihan in southern Brittany (see Figures 5.1 and 5.2). It was identified following storm activity in the 1980s and excavated before it was washed away. Interestingly, there is a further Lower Palaeolithic locality on the western point of the other side of the beach, where a handaxe has been discovered (see Figure 5.3).

Figure 5.2. Photo of La Point de St Colomban, in the foreground the site of Saint Colomban 2, in the distance, to the north on the other side of the bay is the locality of Saint Colomban 1 (photo H. Fluck).

Figure 5.3: handaxe found at Saint Colomban 2 site. Image on a postcard in Carnac Museum collections; the original could not be located.

The site of St Colomban, excavated by Monnier in the 1980s, is believed to originally have been a cave or rockshelter site within a niche eroded by the sea (Giot, Monnier, and L'Helgouac'h 1998; Monnier 1991; Monnier and Le Cloirec 1985). The rockshelter collapsed during further marine ingression and became covered by subsequent beach deposits; the site today, what is left of it, is eroding out of a collapsed cliff. The excavated material is described as coming from an occupation surface; however the material observed for this study is extremely rolled and a primary context seems unlikely. From my observations of the material it is apparent that there may have been some mixing with more recent, possibly Holocene assemblages, making it extremely difficult to confidently interpret the assemblage as Lower Palaeolithic.

The assemblage

The emphasis is often placed on the pebble tool element of the Colombanian assemblages (Monnier and Molines 1993), however, from my observations of the assemblage it is clear that flakes dominate the assemblage from St. Colomban (see Table 5.1). There are also a variety of raw materials present in the assemblage, all present in the locally-available beach pebbles, although flint is the main material used. The observation that different raw materials are used for different elements of the Colombanian assemblage (e.g. Molines 1999) is also not borne out in my observations of the St Colomban assemblage. With a single exception in sandstone, all the flaked pieces are in flint. Likewise the vast majority of flakes (80.6%) are in flint (see table 5.1), although there are also some flakes in quartzite and quartz. The debris makes up just over half of the assemblage; this could imply that there is evidence for *in situ* knapping. However, given the context and the rolled nature of the majority of the other artefacts, it seems more plausible that this material comes from overlying Holocene human activity if it is anthropic. Retouched tools are virtually absent and are only found in flint – a pattern which is observed in other Colombanian assemblages (Molines 1999; Monnier 1996).

	Flint	Quartzite	Quartz	Other	TOTAL
Flaked pieces	12	0	0	1	13 2.2%
Flakes	212	19	24	8	263 *44.7%*
Retouch	4	0	0	0	4 *0.7%*
Debris	191	69	42	5	307 *52.1%*
Hamerstone	0	2	0	0	2 0.3%
TOTAL	419 71.1%	90 15.3%	66 11.2%	14 2.4%	589

Table 5.1: Table showing assemblage composition for St Colomban

The artefacts range in size from 95mm to 15mm, but with the majority falling between 30mm and 40mm. As might be expected the flaked pieces are slightly larger on average than the flakes, but as there is only one flaked piece that is not in flint it is difficult to generalise. The flint artefacts are notably smaller, with flakes of an average length of around 31mm, and retouched tools slightly smaller with an average length of c. 30mm (see Table 5.2). Flaked pieces in flint have an average length of around 40mm. The quartzite flakes are larger with an average length of around 40mm and quartz flakes have an average length of around 37mm. The largest flake however at 73mm is in quartz.

The smaller size of the flint artefacts probably reflects the fact that flint was more intensively worked. This is supported by the higher average number of flake scars on flint artefacts (see table 5.3).

The cores are all non-prepared cores and only one of those in flint could be described as having been knapped around a fixed perimeter. Alternate flaking dominates as a knapping technique, observed on c. 57% of the cores (see table 5.4). The incidence of alternate flaking is even higher when it is considered that the majority of the mixed technique cores were those which included alternate flaking (primarily alternate flaking and single removals).

		Length (mm)					
		Mean	Max.	Min.	Range	Standard Deviation	Count
flint	flaked piece	39.8	52.0	29.0	23.0	7.43	12
	flakes	31.3	58.0	15.0	43.0	7.95	212
	retouch	29.8	34.0	25.0	9.0	4.03	4
	debris	36.5	71.0	18.0	53.0	19.27	191
Total flint		31.8	71.0	15.0	56.0	8.50	419
limestone	flakes	45.0	57.0	33.0	24.0	16.97	2
Total limestone		45.0	57.0	33.0	24.0	16.97	4
quartzite	flakes	40.2	70.0	25.0	45.0	13.5	19
	debris	40.6	50.0	28.0	22.0	6.9	69
	hammerstone	87.5	95.0	80.0	15.0	10.6	2
Total quartzite		43.7	95.0	25.0	70.0	16.0	91
quartz	flakes	37.3	73.0	21.0	52.0	11.9	24
	debris	48.8	61.0	42.0	19.0	6.4	42
Total quartz		40.1	73.0	21.0	52.0	11.8	66
gres	flakes	62.0	62.0	62.0	.0	.	1
Total gres		62.0	62.0	62.0	.0	.	2
other	flaked piece	76.0	76.0	76.0	.0	.	1
	flakes	33.0	38.0	26.0	12.0	4.9	5
Total other		40.2	76.0	26.0	50.0	18.1	8
All Raw material	flaked piece	42.6	76.0	29.0	47.0	12.3	13
	flakes	32.7	73.0	15.0	58.0	9.5	263
	retouch	29.8	34.0	25.0	9.0	4.0	4
	debris	42.2	71.0	18.0	53.0	11.5	307
	hammerstone	87.5	95.0	80.0	15.0	10.6	2
TOTAL WHOLE ASSEMBLAGE		34.3	95.0	15.0	80.0	11.1	590

Table 5.2: Table showing range and average length for St Colomban assemblage

		Number of flake scars					
		Mean	Max.	Min.	Range	Stand. Dev.	N
Flint	flaked piece	3.8	9	1	8.0	2.33	12
	flakes	1.9	7	0	7.0	1.21	212
	retouch	2.0	3	1	2.0	.82	4
Limestone	flakes	3.0	3	3	.0	.	2
Quartzite	flakes	1.8	4	0	4.0	1.08	19
Quartz	flakes	1.4	2	0	2.0	.79	24
Other	flaked piece	2.0	2	2	.0	.	1

Table 5.3: Table showing flake scars for St Colomban assemblage by raw material and artefact type.

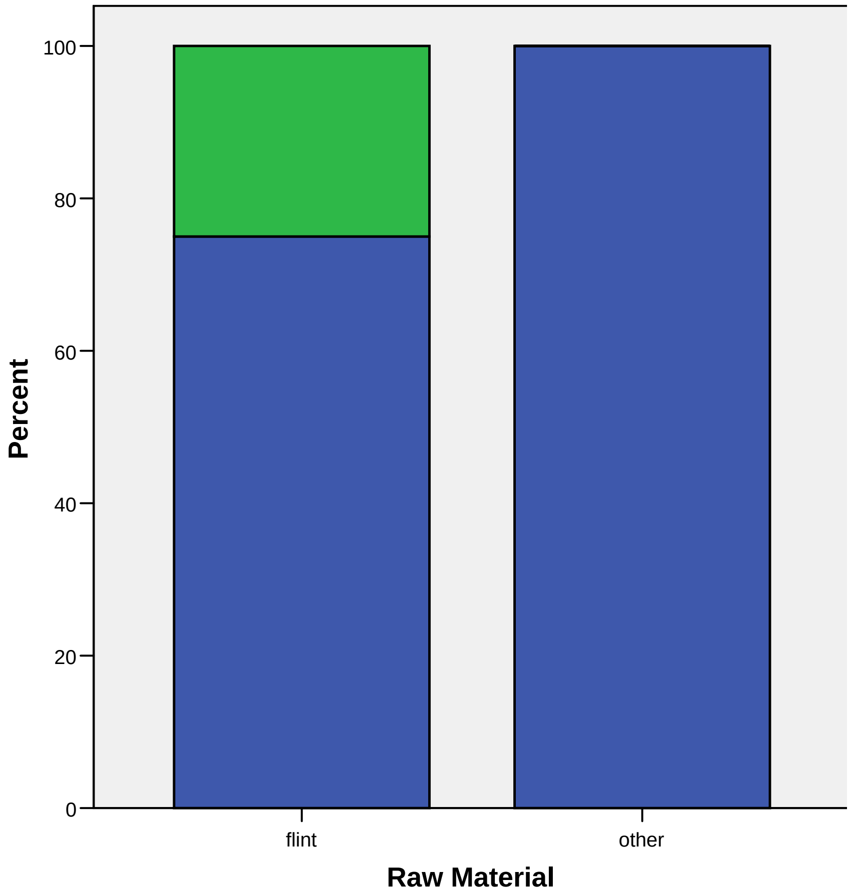

Figure 5.4 Showing distribution of type of flaked piece for St Colomban. Green is Non-PCT flaked pieces with fixed perimeter, blue is Non-PCT flaked pieces with no fixed perimeter.

	Count	Table N %
Alternate flaking	12	57.1%
Alternate Alternate and parallel	7 5	33.3% 23.8%
Parallel Flaking	3	14.3%
Parallel – single episode Parallel – multiple episodes	2 1	9.5% 4.8%
Single scars	2	9.5%
Mixed techniques	4	19.0%

Table 5.4: Table showing flaking techniques observed in the St. Colomban cores.

When the number of flakes from different points in the reduction sequence, identified here by their Toth-type, are analysed for different raw material types (see Figure 5.5), the flint flakes show an interesting pattern compared to the other raw materials. The majority of the flint flake assemblage consists of Toth-type 5 flakes (that is flakes with no cortex on the butt and some cortex on the dorsal). Such flakes would be expected to dominate an assemblage where a core had been reduced *in situ* (McNabb and Kuman *in prep.*), and as such it appears that the flint assemblage may contain the complete *chaine operatoire*. On the other hand the quartz and quartzite assemblages contain a greater proportion of Toth-type 6 flakes (that is flakes with no cortex on either the butt or the dorsal). Such flakes are produced late in the knapping sequence, and their dominance in an assemblage suggests that either cores were brought in already knapped or the flakes were brought in from elsewhere. The absence of cores in quartz and quartzite suggests that these raw materials were more frequently transported than perhaps the flint which appears to have been worked at the site.

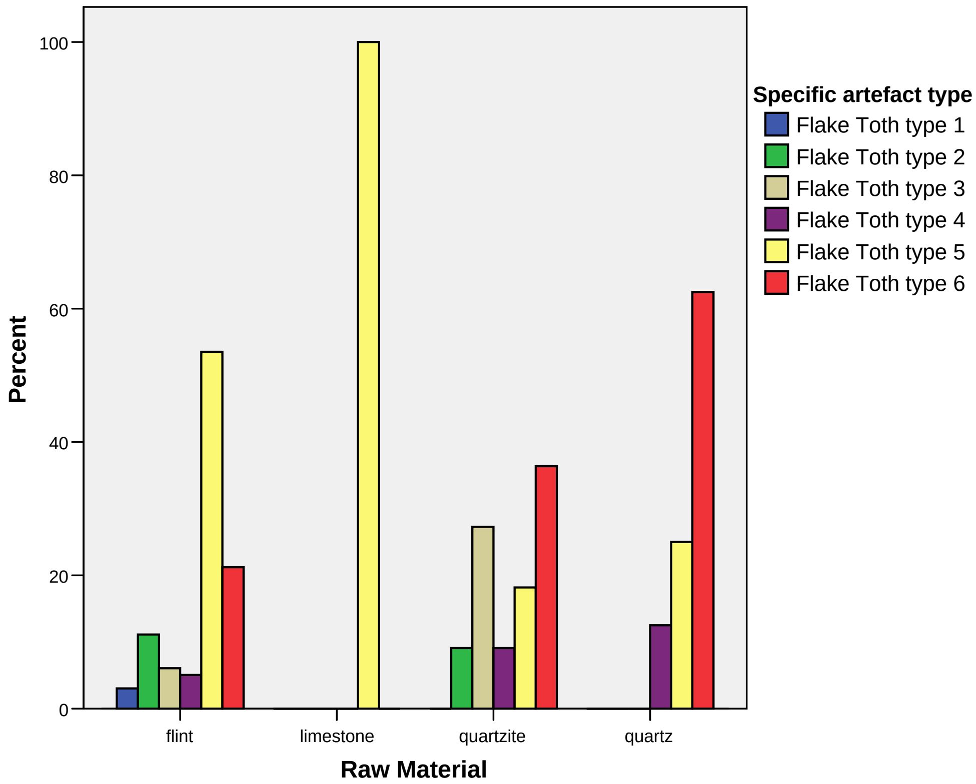

Figure 5.5. Graph showing number of flakes by Toth type for different raw materials.

The retouched tools are extremely rare, with only four examples, all in flint. Three of these are flaked flakes and one has undiagnostic retouch.

The assemblage from La Pointe de Saint Colomban is difficult to interpret. It is extremely rolled and has possibly been mixed with a more recent, less rolled assemblage. Of the 590 artefacts studied from the collection at the Museum of Prehistory in Carnac, only 283 (<50%) are definitely artefacts. The 'heavy tool' element that other researchers have observed at other Colombanian sites (Molines 1999;

Monnier and Molines 1993) is not obviously present, and the assemblage seems to be predominantly a simple flake tool assemblage on local beach pebbles. The near absence of retouched tools and the dominance of alternate flaking and the absence of core preparation make this assemblage similar to the Clactonian. However, questions surrounding the integrity of this assemblage,and the lack of dating, make it difficult to make any detailed comparison. The presence of a handaxe in a contemporary desposit nearby possibly makes St Colomban more similar to Wimereaux and Le Havre (see below).

In summary the site of St Colomban is an eroded marine cave and consists of very rolled material. It is believed to be Middle Pleistocene but there appears to have been some mixing with a Holocene assemblage. The assemblage is dominated by flakes although quartzite handaxe was recovered from near the site. Technologically the knapping is dominated by an alternate knapping strategy with an absence of prepared cores. There are some superficial similarities to the Clactonian, but these are limited.

Menez-Dregan:

Menez-Dregan is the most important locality for the Colombanian assemblages. It is located on the western coast of Brittany, near Plouhinec, in Finistere. There are actually a number of sites at Menez-Dregan, which were identified during surveys by B. Hallégouët in the 1980s, and subsequently by J-L. Monnier, the most famous and the most extensive of these is Menez-Dregan 1 (MD1), pictured below (Figure 5.6). Since 1991 the site has been the subject of excavations by Jean-Laurent Monnier from the University of Rennes; excavations and investigations at the site are ongoing under the direction of Professor Monnier and Dr. Nathalie Molines from the University of Rennes. The site of Menez-Dregan I is in fact a small marine cave which had gradually collapsed thereby protecting the deposits within from marine erosion. The in-fill of this cave, nestled in the cliff on the north side of the Bay of Audierne at Plouhinac, is now exposed to the elements and consists of ten archaeological layers from which a huge volume of artefacts has been recovered (over 11,000, the majority from levels 4 and 5). The stratigraphy at the site is complex and the stratigraphy referred to for this study is based upon that defined during the 1995 season of investigations at the site (Molines 1999; Monnier *et al.* 1995).

Figure 5.6: Menez Dregan 1 Excavations, Summer 2006. (photo H. Fluck).

Figure 5.7: Menez Dregan 1 excavations, Summer 2006. (photo H. Fluck).

Stratigraphy:

Bed 10 consists of a beach of pebbles in a hardened sandy-gravel matrix c.0.8m thick, which lies directly on the bedrock where it has been recorded to date. It is currently the oldest known level at the site, although older levels may be present further into the interior of the cave.

Bed 9 (c.0.4m thick) comprises three horizons distinguishable by their colour and texture. 9a is a hardened clayey-gravel and is associated with a concentration of bones and wood charcoal fragments. 9b is very clayey and yellow brown and contains wood charcoal fragments. 9c contains more angular gravel with bones and wood charcoal in a grey-brown silty-clay matrix. The excavators report a possible hearth from this level associated with bones and lithics.

Level	Sub-level	Date (ESR)	Lithics	Fauna	Fire	Deposit
3	3a	141ka±16ka (on Dune sand)	None	None	None	Dune sand
	3b		None	none	None	Sand
4	4a		261 lithics: 13% flakes; 2% retouched; 52% debris; 33% flaked pieces.			Large granite blocks
	4b		2203 lithics: 21% flakes; 4% retouched; 65% debris; 10% flaked pieces			Marine pebbles
	4c		None			Organic deposits
5	5a/a'		2836 lithics: 24% flakes; 4% retouched; 65% debris; 7% flaked pieces			Alternating dark and light brown Dark brown organic rich.
	5b/b'		2777 lithics: 20% flakes; 2% retouched; 72% debris; 6% flaked pieces			
	5c/c'		642 lithics: 10% flakes; 2% retouched; 83% debris; 5% flaked pieces.			
	5d/d'		956 lithics: 22% flakes; 2% retouched; 66% debris; 10% flaked pieces.			
	5e	377ka±52ka (burnt pebbles) 369ka±47ka (sediment) 396ka±45ka (sediment)	159 lithics: 24% flakes; 2% retouched; 61% debris; 13% flaked pieces		Yes	
6			368 lithics: 22% flakes; 7% retouched; 49% debris; 22% flaked pieces.		Yes	Pebbles
7	7a		809 lithics: 24% flakes; 6% retouched; 60% debris; 10% flaked pieces.		?	Black alternating clay and sandy gravel
	7b					
	7c					
	7d					
8			Rolled lithic assemblage at base possibly vestiges of Bed 9.	Some at base		Beach deposit
9	9a	465ka±65ka (burnt sediment)	Lithics present in small quantities. Level yet to be widely excavated	yes		Clayey gravel
	9b					clay
	9c			yes	?	gravel
10						Beach pebbles

Table 5.5: summary of Menez-Dregan I, data after Molines 1999.

Bed 8 (c. 0.15m thick) is a beach deposit consisting of a homogeneous yellow-brown sand with some small angular pebbles. The deposit changes slightly in places with more angular gravel and pebbles. A rolled lithic assemblage along with some bones and wood charcoal has been recovered from a sandy-clay at the base of the sequence.

This has been interpreted as possibly the remains of a surface of Bed 9 (Molines 1999).

Bed 7 (see Figure 5.9) (c.0.3m thick) is an extremely black layer with alternating horizons of clay and sandy-gravel which are subdivided into 7a-d. This bed contains abundant archaeological material and possible traces of hearths.

Bed 6 (see figure 5.9) is a level of pebbles present throughout most of the cave. It could be a natural level but has strong indications of human activity with lithic material and a hearth at the top of this bed. Evidence of human activity becomes more frequent towards the top of this unit.

Bed 5 (see Figure 5.9 and 5.8) (c. 0.4m thick) consists of at least four alternating light and dark brown horizons. The dark layers are rich in organic material and the light brown ones are rich in lithic material. The lowermost dark brown level (5e) contains hardly any lithics and consists of sand with compact clay lenses. It is rich in charcoal and contains some burnt flint fragments. It is suggested that this level may also contain anthropic fires.

Bed 4 is subdivided into three horizons: 4a has large granite blocks; 4b has a large number of marine pebbles; the base, 4c, consists of black deposits indicating a transition from Bed 5 and contains some artefacts.

Bed 3 does not contain any lithics; level 3a represents the final infilling of the cave and consists of a dune sand while the base, 3a, consists entirely of sand.
The two uppermost beds relate to the final collapse of the cave.

Fauna

Due to the acidity of the soil faunal remains are extremely rare and poorly preserved. Where found the remains represent fragments of medium to large mammals (Molines 2006, pers. comm.) although, given the poor preservation, this may be the result of bone survival rather than representative of paleo-assemblage.

Figure 5.8: close up of fresh lithic material in level 5d. (Photo H. Fluck).

Figure 5.9: West facing section from the southern part of the site showing main levels excavated to date at Menez-Dregan I. (Photo H. Fluck).

Lithics

For the purposes of this study I was able to arrange access to a small number of unpublished artefacts from levels 7 and 9; these levels had been selected as of particular interest for this study given the dates obtained for the site (see table 5.5).

Bed/level	Total	Flakes	Retouched	Flaked pieces	Debris
4a	261	13%	2%	33%	52%
4b	2203	21%	4%	10%	65%
4c	None				
5a/a'	2836	24%	4%	7%	65%
5b/b'	2777	20%	2%	6%	72%
5c/c'	642	10%	2%	5%	83%
5d/d'	956	22%	2%	10%	66%
5e	159	24%	2%	13%	61%
6	368	22%	7%	22%	49%
7	809 (190)	24% (56.3%, N=107)	6% (2.6%, N=5)	10% (21.6%, N=41)	60% (19.5%, N=37)
8	Rolled lithic assemblage at base possibly vestiges of Bed 9.				
9	Lithics present in small quantities. Level yet to be widely excavated. Of the 6 artefacts observed 2 were flaked pieces, 3 flakes and 1 debris				

Table 5.6: quantities of different artefact types from each level. Data from Molines 1999. Quantities in brackets for level 7 are from my data.

Unfortunately, due to storage problems and ongoing excavation of the site I was unable to gain access to a suitable controlled sample of material from the site therefore much of the statistical data presented here comes from Molines 1999 enhanced by my own observations and data where relevant.

The proportion of flakes and debris are similar for all levels. Molines (*ibid.*) observes the appearance of a large tool element in Bed 7, which increases slightly in Bed 6 but theseare practically absent from Beds 5 and 4 (Molines 1999).

Raw material:

The raw material is varied. Flint was preferentially used for flakes and retouched pieces and in fact is the dominant raw material in all levels. However as Molines observed there are a significant number of pieces in an indurated sandstone (Gres), quartz and quartzite. Contrary to Molines' claim these do not appear to be primarily flaked pieces, indeed several of the quartz, quartzite and sandstone flakes were retouched. However from Molines' report (1999) it is clear that the quartz, quartzite and gres pebbles were less intensively exploited, possibly as it was the edge of the flaked piece rather than the resulting flakes which the knappers were after.

The size of the artefacts in the assemblage varies but the size of the raw material nodules available did not limit the size of the artefacts produced. Pebbles of up to 20 centimetres were utilised, with an average length in the region of 110mm; many of these are what Molines describes as choppers and chopping tools (See Molines 1999: 172 and 184). What Molines describes as cores are slightly smaller, normally in the region of 60mm in length. The flake tools have a modal length of 45mm and are typically almost as wide as they are long (Molines 1999: 160). The unretouched flakes are slightly smaller, suggesting that larger flakes were deliberately selected to be retouched. Again, they are as wide as they are long.

Level	Raw material	Flake	Flaked piece	Retouched	Debris	Total
4	**flint**	438	74	71		583
	gres	16	1	6		23
	quartz	38	11	10		59
	quartzite	-	2	2		4
	Other	3	1	1		5
	Total	495	89	90		674
5	**Flint**	1378	373	177		1928
	Gres	45	3	17		65
	Quartz	122	28	20		170
	Quartzite	4	12	2		18
	Other	7	-	5		12
	Total	1556	416	221		2293
6	**Flint**	64	33	19		116
	Gres	11	-	1		12
	Quartz	4	2	2		8
	Quartzite	1	2	2		5
	Other	1	1	1		3
	Total	81	38	25		144
7	**Flint**	165 (73)	20 (30)	38 (3)	(5)	123 (111)
	Gres	9 (19)	1 (5)	3 (1)	(7)	13 (32)
	Quartz	14 (11)	1 (4)	4 (1)	(15)	19 (31)
	Quartzite	2 (2)	4 (1)	1	(4)	7 (7)
	Other	2 (2)	- (1)	3	(6)	5 (9)
	Total	194 (107)	26 (41)	49 (5)	(37)	(190)
8	**Flint**			2		2
	Quartz			1		1
	Total			3		3
9	**Flint**	(2)	1 (2)	1		2 (4)
	Gres	(1)				(1)
	Quartz			1	(1)	1 (1)
	Total					

Table 5.7: artefacts and raw material by archaeological level.

		Alternate flaking	Alternate and parallel flaking	Parallel flaking-multiple episodes	Single scars	Mixed techniques	Other non-PCT core	TOTAL
Menez-Dregan I Level 7	Flint	8	9	3	6	3	1	30
	Quartzite	0	0	0	1	0	0	1
	Quartz	1	1	0	1	0	0	3
	Gres	1	1	0	2	2	0	6
	Other	0	1	0	0	0	0	1
	TOTAL	10	12	3	10	5	1	
Menez-Dregan I Level 9	Flint	1	1	0	0	0	0	2
	quartzite	0	0	0	0	0	0	
	Quartz	0	0	0	0	0	0	
	Gres	0	0	0	0	0	0	
	Other	0	0	0	0	0	0	
	TOTAL	1	1					

Table 5.8: Flaking strategies observed, from my data.

The flaked pieces are principally in flint and alternate flaking is the preferred technique, although single scars are seen more frequently in the non-flint raw materials. This is possibly indicative of nodule testing and is consistent with the fact that while other rocks were utilised, flint was the preferred raw material. However, for the artefacts with single removals, wave action in this littoral environment cannot be entirely dismissed. The cores were also not particularly intensively exploited, given their size (average 60mm, but this does not include what Molines classes as 'choppers'), with the majority having between 5 and 7 removals. When one takes into account those artefacts which Molines classes as choppers they were even less intensly exploited.

		Flake Toth type 1	Flake Toth type 2	Flake Toth type 3	Flake Toth type 4	Flake Toth type 5	Flake Toth type 6	Broken hard hammer flake	TOTAL
Menez-Dregan I Level 7	**flint**	3	7	1	0	27	10	28	76
	quartzite	0	0	0	0	0	0	2	2
	quartz	0	1	1	0	0	3	7	12
	gres	1	5	0	1	1	2	9	19
	other	0	0	0	0	1	0	0	1
TOTAL		4	13	2	1	29	15	46	
Menez-Dregan I Level 9	**Flint**	0	0	0	0	1	1	0	2
	Quatzite	0	0	0	0	0	0	0	
	QUARTZ	0	0	0	0	0	0	0	
	GRES	0	0	0	0	0	0	1	1
	OTHER	0	0	0	0	0	0	0	
TOTAL						1	1	1	

Table 5.9: Flake Toth-type for flakes observed from Menez Dregan from my data.

The flakes are also predominantly on flint. Those flint flakes which are not broken show a pattern consistent with *in situ* knapping, with a greater percentage of flakes with no cortex on the butt and some cortex on the dorsal, Toth-type 5. The numbers of flakes in other raw materials for which data could be collected is not sufficient to draw any conclusions. The majority of the flakes are broken.

The retouched tools are dominated by denticulates in all levels with a high number of notches and scrapers.

evel	Scraper		Denticulate		Bec		Piercer		Biface		Notches (no distinction of retouch & flaked flakes)		Multiple tools		Flaked flake		Non-diagnostic		TOTAL
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	
4a	-		4	80	-		-		-		1	20	-		-		-		5
4b	16	18.8	34	40	6	7.1	-		-		25	29.4	4	4.7	-		-		85
5a/a’	16	13.2	54	44.6	9	7.4	-		-		36	29.8	6	5	-		-		121
5b/b’	15	21.7	37	30.6	2	2.9	2	2.9	-		12	17.4	1	1.4	-		-		69
5c/c’	1	9.1	5	45.5	1	9.1	-		-		3	27.3	1	9.1	-		-		11
5d/d’	1	5	6	30	1	5	-		-		9	45	3	15	-		-		20
5e	-		2	66.7	-		-		-		1	33.3	-		-		-		3
6	6	24	14	56	-		-		-		4	16	1	4	-		-		25
7	13	26.5	16	32.7	1	2	1	2	-		15	30.6	3	6.1	-		-		49
7 observed	1	20	-		-		-		1	20	-		-		1	20	2	40	5
8	1	50	1	50	-		-		-		-		-		-		-		2
9	1	33.3	1	33.3	1	33.3	-		-		-		-		-		-		3
Total	70 (1)	17.8	174	44.3	21	5.3	3	0.8	(1)		106	27	19	4.8	(1)		(2)		393 (5)

Table 5.10: Table showing retouched tools types by layer for Menez-Dregan (Data from Molines 1999). Grey indicates most frequent tool type.

Summary

Menez Dregan is a significant site in establishing the nature of the Breton Middle Pleistocene assemblages. Unlike many others in the region it is well stratified and has been dated using radiometric techniques. Although the dates are not without their problems, the site seems to represent an occupation from c. MIS13 through to c. MIS 5e. Handaxes are present in some levels, but generally speaking the assemblages are a non-biface ones throughout the site’s history. However, it is important to note that the handaxes identified in the course of this study (see Chapter figure 2.21) had not been categorised as such, and the absence of handaxes could reflect the typology used by the excavators as much as a genuine absence.

The site represents a hominin occupation of a marine-formed cave on or close to the sea shore and contains evidence of multiple occupation horizons dating from c. MIS 13 to MIS5e. There is some evidence for fire use and handaxes are present in some levels, although not described as such. Flint is the preferred raw material but some larger local pebbles are also used.

The Dordogne and the Garonne

The Dordogne and Vezere rivers are synonymous with Palaeolithic research, however there are relatively few Middle Pleistocene sites in this area in comparison with the richness of Upper Pleistocene sites. Nevertheless a number of interesting NBA sites have been identified which are discussed below. The area of the Garonne which lies to the south of the Dordogne, although they flow into the sea at more or less the same point, has also been identified as an area poor in handaxes despite abundant material having been collected (Jaubert and Servelle 1996). However, the poverty of the raw material in this area may play a key part in this; the area has little flint and instead hominins made use of locally-available quartz and quartzite pebbles which some (*ibid.*) have argued are not suitable for making large tools such as handaxes. Although I have not seen the material first hand, the illustrations in Jaubert and Servelle's publication (1996) show pebbles of around 10cm, in my experience of sufficient size to knap a biface and certainly not in the league of sites such as Vértesszölös where the small size of the available pebbles is certainly restrictive. Indeed bifaces have been found, just not in large numbers. While interesting as an area of rare and unstandardised bifaces (*ibid.)* the material is largely collected, and there are few substantial assemblages one could describe as NBAs.

La Micoque

The site of La Micoque was selected primarily for its historical role in the debate regarding the origin and relationship of non-biface flake-based industries. It is located in the valley of the Manuarie, a minor tributary on the right bank of the Vezere, near Les Eyzies, in the Dordogne area of south west France. It was first discovered in 1895 whilst ploughing (it had been concealed under a talus deposit) and excavated on a number of occasions by various researchers between 1896 and 1990 (see table 5.11; Hauser 1908; Breuil 1932; Peyrony 1938; Bourgon 1957; Bordes 1969; Bosinski 1970; Rolland 1986; Geneste 1990). A number of archaeological layers were identified and the various and the varied interpretations of these levels chart the changes in Palaeolithic archaeology over the past century as they were reinterpreted according to new ideas and typologies of the day. The bottom two layers are of particular interest as these were originally interpreted as Clactonian by the Abbé Breuil (1932), although they were later reinterpreted as Tayacian (Peyrony 1938, Rolland 1986), another cultural label attached to flake industries, particularly in southern France considered to be ancestral to the Mousterian. The lower levels of La Micoque are believed to date from c. 350ka (Falgueres, Bahain, and Saleki 1997), corresponding to MIS9.

Arch. layer	Breuil (1932)	Peyrony (1938)	Bourgon (1957)	Bordes (1969)	Bosinski (1970)	Rolland (1986)	Geneste (1990)
6	Micoquian	Micoquian	Micoquian	Micoquian	Micoquian	Micoquian	Micoquian
5	Tayacian	Tayacian	Acheulean	Acheulean méridional	Micoquian	Acheulean	Acheulean méridional
4	Tayacian	Mousterian	Pre-Mousterian	Pre-Mousterian	Micoquian	Tayacian/ Proto Levallois	Middle Palaeolithic
3	Clactonian	Tayacian	Pre-Mousterian	Pre-Mousterian	Micoquian	Tayacian	Middle Palaeolithic
2	Clactonian	Tayacian	Tayacian	Non-determined	Micoquian	Clacto-Abbevillian	Non-determined
1	Clactonian	Non-determined	Non-determined	Clactonian Acheulean or Clactonian	Micoquian	Non-determined	Non-determined

Table 5.11. Historical interpretations of La Micocque

Following Breuil's interpretation of the deposits (1938), which contradicted the interpretation of the deposits by their excavator Peyrony who interpreted the sediments as largely fluvial (Falgueres, Bahain *et al.* 1997), the site was interpreted for many years as a rock shelter filled with cryoclastic deposits (Bordes and Prat 1965; Laville 1974; Laville and Rigaud 1969).The site was re-investigated in the 1980s and the resulting chronostratigraphic analysis rewrote the interpretation of the site (Debenath and Rigaud 1986; Laville, Rigaud, and Texier 1986; Rigaud 1991; Texier and Bertran 1993). Rather than cryoclastic deposits, these researchers proposed that the complex stratigraphy, and extremely poor condition of the artefacts (particularly in the lowest levels) were consistent with a fluvial deposit. Reinterpretation of the work by Debenath and Rigaud, which identified 75 layers, placed these within three stratigraphic units relating to two terrace deposits and an upper colluvial deposit, much closer to Peyrony's original interpretation (see Texier and Bertran 1993).

The complexity of the stratigraphic interpretation presented in the literature has been compounded by the fact that most of the upper levels have been entirely removed. When one considers the units following the interpretation set out by Texier and Betran (1993), the sequence is in fact fairly simple. Unfortunately, today only a small witness section remains which is somewhat overgrown (see figure 5.11). The stratigraphy outlined here follows the work of Texier, Rigaud, et al following reinvestigation of the site in the 1980s (Debenath and Rigaud 1986; Laville, Rigaud, and Texier 1986; Rigaud 1991; Texier and Bertran 1993). These researchers have identified three stratigraphic units. The Basal Unit consists of two layers of horizontally-bedded gravels, the uppermost of which gradually grades to slope deposits (Texier and Bertran 1993). These layers correlate to the basal levels first identified by Laville and Rigaud (1969), having been missed by Peyrony's original excavations. The two fluvial deposits are consistent with a braided channel system with cold dry periods. The slope deposits are contemporaneous with the latter fluvial deposit (Texier and Bertran 1993).

The Basal Unit is distinguished from the Middle Unit by a layer of boulders (visible in the photo of the section as it is today). The Middle Unit consists of the lowest levels identified by Peyrony (A to M) and also contains the majority of the archaeological horizons. The base of this middle sequence consists of c. 1m of clay, which is overlain by c.7m of pebbly deposits which are intercalated with reddish slope deposits. The sandy clay at the base of the Middle Unit is likely to have been deposited in a temperate environment by a slow flowing stream. The overlying fluvial gravel deposits are similar to those of the Basal Unit – braided stream with periodic arid cold spells. The deposit is also intercalated with slope deposits contemporary with the stream.
The Upper Unit is only about 2m thick, and consists of clayey sand with pebbles filling a runnel which cuts the Middle Unit deposits. This deposit can be considered to be slopewash.

The Basal and Middle Units are interpreted as representing two terraces which correlate with terraces of the Vezere which date to MIS12 and MIS10 respectively. This makes the clay deposit, and archaeological levels 1 and 2, MIS11 (Falgueres, Bahain, and Saleki 1997), potentially contemporaneous with the British Clactonian.
The archaeological level 1 assemblage lies within the sandy clay deposit at the base of the Middle Unit. The lithics and faunal remains are within breccia blocks which have been reworked into the fluvial deposit and probably originated in a rock shelter deposit upstream or within the cliff. The date of this archaeological material is therefore earlier than the date assigned to the deposit in which they are found, possibly the end of MIS 12.

The Archaeological Level 2 assemblage lies at the top of the MIS 11 clayey fluvial depositwithin the MIS10 deposit, and has been extensively reworked, leaving the material from this level in an extremely poor condition. This material is understood to represent hominin activity on a longitudinal gravel bar. This is also the case for Archaeological Levels 3 and 4, although the preservation varies.

Fauna:
There are few faunal remains from the lower archaeological levels. Level 1 contains only horse (*Equus caballus cf mosbachensis*) and bovids, Level 2 contains these species with some addition rhinoceros remains. Level 3 has abundant faunal remains, mostly horse with occasional bovids and red deer. Level 4 contains only horse and bovids.

I was able to study material from the Peyrony excavation held in the Prehistoric Museum in Les Eyzies. My principal aim was to focus on material from Levels 1, 2 and 3 from Peyrony's excavations, as these are the levels that have been referred to in the Clactonian debate. While material from the lower levels of Hauser's earlier excavations (Hauser 1908) was also viewed, the time constraints meant that only a 10% sample from the lowest level was studied. The difficulties with correlating Hauser's levels with those originally discussed meant that it was considered more important to focus on Peyrony's assemblage which was the source of much of the historical discussion. Given the large quantity of artefacts (except from Level 1) and limited time, a sampling strategy was applied. All the material from the Level 3 assemblage was viewed; however there was insufficient time to study the whole assemblage in detail. Therefore, all of the cores were studied along with 50% of the other material, 756 pieces in all. All the Level 2 material (1292 pieces) was studied, as was all the Level 1 material (15 pieces). The material from Levels 5 and 4 was also viewed, and a 10% sample from Level 4 studied (49 pieces).

The assemblage
The raw material at the site is almost exclusively flint, probably locally sourced from the river valley, although given the desilicified, rolled and patinated nature of the majority of the artefacts it is impossible to determine whether any raw material sources were used from further afield (such as the famous Bergeraçois flint which is found some 20-30km away). The condition of the assemblage also hindered the

analysis, with many damaged pieces where the nature/presence of retouch could not be established. The condition was particularly poor for the second level, where nearly two thirds (808 of 1292) of the collection were classed as debris with a questionable artefact status (see table 5.13). The historical debate regarding the classification of the various levels of this site seems slightly absurd when viewed against the reality of the assemblage, in particular the lowest level of which only 15 pieces are present in the museum's collections, five of which are of indeterminate status (see Figure 5.11). It may be that pieces were given away to colleagues at other museums around the world, as was often done in the early twentieth century (although there is no record of this), but it does seem odd that so much debate could surround ten poor artefacts!

Figure 5.10: the site of La Micoque today (Photo H. Fluck).

The assemblages are of a fairly consistent size, with flaked pieces averaging between 70 and 75mm. The flakes are consistently smaller than the flaked pieces, and are notably smaller in the lower two assemblages (Level 1 and Level 2) where they average less than 50mm in length, compared to Levels 3 and 4 where they average over 60mm (see Table 5.12). This size difference is interesting given that the source of raw material appears to have remained the same. The larger flake size may reflect the presence of bifaces in levels 3 and 4 with these assemblages more focused on large cutting tools compared to the smaller, more simply-retouched toolkit of Level 2.

		Length (mm)				
		Mean	Maximum	Minimum	Standard Deviation	Count
La Micoque level 1	Flaked piece	70.0	74.0	66.0	5.66	2
	Flake	49.9	76.0	31.0	12.77	8
	TOTAL	47.4	76.0	30.0	14.95	15
La Micoque level 2	Flaked piece	72.5	667.0	35.0	94.08	43
	Flake	41.1	75.0	18.0	11.44	413
	Retouched	50.7	71.0	31.0	11.57	27
	TOTAL	44.5	667.0	18.0	27.15	1292
La Micoque level 3	Flaked piece	74.5	143.0	32.0	18.14	138
	Flake	62.2	113.0	7.0	14.24	388
	Retouched	68.6	121.0	41.0	13.30	174
	Biface	93.0	93.0	93.0	.	1
	Non classic biface (13)	81.4	98.0	61.0	13.84	7
	TOTAL	65.8	143.0	7.0	15.76	756
La Micoque level 4	Flaked piece	74.6	78.0	67.0	4.39	5
	Flake	67.0	98.0	41.0	15.51	29
	Retouched	67.3	87.0	42.0	11.68	14
	TOTAL	67.9	98.0	41.0	13.58	49
La Micoque level J Hauser	Flaked piece	100.0	100.0	100.0	.	1
	Flake	66.0	70.0	62.0	5.66	2
	TOTAL	77.3	100.0	62.0	20.03	3

Table 5.12. Length of artefacts from La Micoque by type and level.

The retouched pieces on average are larger than the unretouched pieces, although the difference is most marked in Level 2 where the retouched pieces are nearly 10mm longer on average. In level 3 the difference has diminished to just over 6mm and by Level 4 the difference is less than half a mm. This would suggest that certainly in the earlier Levels the hominins were deliberately selecting larger flakes for use and retouching.

Level	Flake		Flaked piece		Retouched		Biface		Debris		Total
1	8	53.3%	2	13.3%	0	-	0	-	5	33.3%	15
2	413	32%	43	3.3%	27	2.1%	0	-	808	62.5%	1292
3	388	51.3%	118	2.4%	174	23%	8	1.1%	48	6.3%	756
4	29	59.2%	5	10.2%	14	28.6%	0	-	1	2%	49
Hauser Level J	2	66.7%	1	33.3	0	-	0	-	0	-	3
Total							8				

Table 5.13: Distribution of basic tool types in different layers of La Micoque. Note that the figures for Levels 1 and 2 represent 100% sample while figures for level 3 represent a 50% sample and those for level 4 and level J Hauser a 10% sample.

Overall the size of the artefacts is greater than many of the assemblages studied here (e.g. Vértesszőlős, Bolomor etc) and it seems fair to say that the absence of bifaces from Levels 1 and 2 is not due to raw material size.

Flakes dominate the assemblage, making up over half the assemblage in each level. The one exception to this is Level 2 where the majority of the assemblage consists of fragments that may have resulted from knapping, but given their poor condition it cannot be certain. If we exclude these from the discussion then the vast majority of the assemblage from Level 2 is flakes.

Core type	La Micoque level 1	La Micoque level 2	La Micoque level 3	La Micoque level 4	La Micoque level J (Hauser)	Total
Non-PCT cores	2 100%	38 88.4%	91 65.9%	4 80%	0	135
Non-PCT cores fixed perimeter	0	3 7%	43 31.2%	1 2%0	1 100%	48
PCT cores fixed perimeter and flaking face	0	2 4.7%	4 2.9%	0	0	6
Total	2	43	138	5	1	189

Table 5.14. Types of flaked pieces from La Micoque by level

The cores are not very numerous, typically making up less than 5% of the assemblage with the exception of Level 1 and Level 4 where there are 13% and 10% respectively. Both the Level 1 cores are irregular non-PCT cores, one with alternate and parallel flaking, the other flaked with mixed techniques (alternate flaking and a single removal).

The Level 2 cores display more variability, although it should be noted that the condition of the artefacts often made it difficult to determine the nature of the cores. The majority (95.4%) are non-prepared cores and only a small proportion of these (7% of the total) have been knapped around a fixed perimeter. There are two identifiable prepared cores, one is a radially flaked core the other has parallel removals. Nearly a third of the cores from Level 2 have been alternately flaked, over half when the component of alternate flaking in the mixed techniques category is taken into account. Single removals account for 30% of the cores, indicating that the material has not been intensively exploited (see Table 5.15). Interestingly parallel flaking alone (i.e. not in conjunction with alternate flaking) is extremely rare.

In Level 3, 40 percent of the cores display alternate flaking and with those within the mixed technique category taken into account the figure is closer to seventy percent. Parallel flaking makes up a higher percentage than seen in level two with just over 14% of the cores and there are significantly fewer cores displaying only single removals. Level three also contains a number of bifaces, mostly non-classics.

	La Micoque level 1	La Micoque level 2	La Micoque level 3	La Micoque level 4	La Micoque Level J Hauser
Alternate flaking	1 50%	12 27.9%	59 40.0%	1 20%	1 100%
Alternate only	0	9	23	1	0
Alternate & parallel	1	3	36	0	1
Parallel	0	1 2.3%	21 14.1%	2 40%	0
Single episode	0	1	6	1	0
Multiple episodes	0	0	15	1	0
Single scars	0	13 30.2%	9 6.0%	1 20%	0
Mixed techniques	1 50%	15 34.9%	46 30.9%	1 20%	0
PCT	0	2 4.7%	6 4.0%	0	0
Radial core	0	1	4	0	0
Convergent core	0	0	1	0	0
Parallel/laminar core	0	1	1	0	0
Classic biface	0	0	1 0.7%	0	0
Non-classic biface	0	0	7 4.7%	0	0
TOTAL FLAKES PIECES	2	43	149	5	1

Table 5.15. Flaking techniques observed on cores studied.

As for Level 4, a 10% sample of the assemblage was studied, only 5 cores, it is difficult to draw any conclusions; however the technique appear to be more evenly-spread between alternate and parallel flaking.

Figure 5.11: La Micoque level 1 assemblage (Photo H. Fluck).

Figure 5.12. La Micoque Level 2.Note the poor condition of the artefacts (Photo H. Fluck).

Figure 5.13. La Micoque Level 3 (Photo H. Fluck).

Figure 5.14. La Micoque Level 4 (Photo H. Fluck).

	Level 1	Level 2	Level 3	Level 4	Hauser Level J
Flake Toth type 1	0	0	2 0.4%	0	0
Flake Toth type 2	0	7 1.6%	53 9.6%	4 9.3%	1 50%
Flake Toth type 3	0	2 0.5%	23 4.2%	0	0
Flake Toth type 4	0	2 0.5%	0	0	0
Flake Toth type 5	4 50%	84 19.2%	191 34.6	12 27.9%	1 50%
Flake Toth type 6	0	68 15.5%	60 10.9%	8 18.6%	0
Broken hard hammer flake	4 50%	275 62.8%	223 40.4%	19 44.2%	0
PCT radial flake	0	0	2	0	0
TOTAL FLAKES	8	438	552	43	2

Table 5.16. Flake types observed from la Micoque. Note that level 4 represents only a 10% sample and Level J a 50% sample.

There are a high number of broken flakes in all the assemblages, with Level 2 having the most with over sixty percent of flakes from this assemblage broken. All of the flakes observed were consistent with hard hammer percussion, although given the poor condition of the artefacts this was difficult to confirm. For the most part the butts were plain and unprepared. Flakes from most of the knapping sequence were present although there were very few entirely cortical flakes (Toth type 1) from any of the assemblages.

Butt type	Level 1	Level 2	Level 3	Level 4	Level J Hauser
Plain	4 80%	179 89.9%	233 68.5%	20 83.3%	1 50%
Dihedral	0	8 4.0%	8 2.4%	0	0
Cortical	1 20%	10 5.0%	81 23.8%	3 12.5%	1 50%
Shattered	0	2 1.0%	18 5.3%	1 4.2%	0
TOTAL	5	199	340	24	2

Table 5.17. Butt type.

Given the small size of Level 1 it is difficult to say much about these flakes. Those that were not broken had some residual cortex on their dorsal surface (Toth type 5). Level 2 has a much larger assemblage, although the majority of these flakes were broken (62.8%). There are very few flakes from the level 2 assemblage with cortical butts (types 1-3) and the majority have some cortex on the dorsal. The pattern seems to be consistent with that observed for *in-situ* knapping, although there are slightly fewer flakes from earlier in the sequence than might be expected, indicating that the cores may have been worked slightly before they were brought to the site. It is also important to remember that the Level 2 material has been reworked considerably and is in a secondary context, making it more difficult to infer *in situ* activity.

The Level 3 material also has a high incidence of broken flakes (around 40%). It too has a pattern of Toth type distribution consistent with *in-situ* knapping with a higher incidence of type 5 flakes. Level 3 also contains two flakes which appear to be from a radially-prepared core.

The small sample studied from Level 4 makes it difficult to draw any secure conclusions but the pattern is consistent with that seen in the other levels with an elevated Toth type 5 count.

The incidence of retouched pieces is fairly high from Levels 3 and 4 where retouched tools make up over 20% of the assemblage. This contrasts notably with Level 2 where only 2.1% of the assemblage is retouched, 5.6% of the artefactual assemblage. The low incidence of retouched tools from Level 2 is probably due to the extremely rolled condition of the artefacts which makes identification of retouch difficult rather than a genuinely low incidence of retouch.

	La Micoque level 1	La Micoque level 2	La Micoque level 3	La Micoque level 4	La Micoque level J Hauser
Convergent retouch	0	0	7 4.0%	0	0
Denticulate	0	2 7.4%	25 14.4%	0	0
Scrapers	0	10 37.0%	66 37.9%	7 53.8%	0
Side scraper	0	8	42	5	0
End scraper	0	2	20	2	0
Scraper retouch	0	0	4	0	0
Flaked flake or flaked flake spall	0	3 11.1%	14 8.0%	0	0
Retouched notch	0	5 18.5%	15 8.6%	2 15.4%	0
Retouched – non-diagnostic	0	2 7.4%	26 14.9%	1 7.7%	0
Multiple tool	0	5 18.5%	21 12.1%	4 30.8%	0
TOTAL	0	27	174	13	0

Table 5.18 Retouched tool types for La Micoque

Scrapers dominate the retouched tools from all the levels, mainly side scrapers. In Level 2 retouched notches and multiple tools are the next most common types. Flaked flakes make up 11.1% of the Level 2 assemblage and denticulates are represented by only two examples (7.4%). In Level 3 while the proportion of scrapers remains broadly the same, the percentage of denticulates greatly increases to 14.4% while proportions of retouched notches and flaked flakes fall. In level three are seven examples (4%) of convergent retouch. At least one of these is on a flake from a convergent prepared core, two others are convergent denticulates, what might sometimes be referred to as a Tayacian point, and the others are convergent scraper retouch. In Level 4 scrapers make up an even greater proportion of the assemblage (53.8%) the remainder consisting of multiple tools, retouched notches and undiagnostic retouched pieces. Overall the lithics are very different from the British Clactonian.

In conclusion the assemblage from La Micoque is disappointing. The paucity of artefacts from the lowest level make it impossible to reach any conclusions. The poor condition of level 2 also hampers interpretation and by levels 3 and 4 the assemblage contains occasional bifaces and prepared cores and therefore is not a Non-Biface

Assemblage. The site remains an important one historically but the quality and nature of the assemblage has made it of little more than a passing interest to this study.

The site can be summarised as representing hominin activity at the base of a cliff on gravel bar from MIS9 onward. The assemblages from Level 1 and 2 are NBA but there are few artefacts and those that are present are in a poor condition. The site is historically significant in its contribution to the debate but its contributions today are primarily the lithic assemblages from its upper biface layers. No similarity to the Clactonian can be observed.

Les Tares

Les Tares is an open air site situated on a terrace of the River Isle in the Sourzac region of France. The site was discovered by J.-P. Texier in 1972 during a survey of the terraces of the region. The abundance of flint artefacts associated with badly preserved bone caught his attention and the site was excavated over the following few years.

Stratigraphy, dating and location

Texier has undertaken a study of the deposits in this part of the Isle Valley identifying the alluvial deposits at the base of the valley as Wurmian and the three lower terraces as corresponding to the Riss. The archaeological material is associated with a silty-clay deposit at the top of a terrace which has been attributed to the middle Riss. Pollen analysis, in combination with stratigraphic and sedimentological studies, has placed the bed containing the archaeological material in the Riss III stage (Rigaud and Texier 1981) which is broadly equivalent to MIS 9.

The deposits containing the archaeology are gleyed and indicate a closed and damp environment, possibly a marsh or boggy area. The excavators describe the hominins using the site at the edge of a marshy area created by an oxbow lake for butchery activities (Rigaud and Texier 1981). The fine sediment means that the assemblage is in mint condition.

During a visit to the Museum of Prehistory in Les Eyzies I was able to study a sample of the material from Les Tares. Due to time constraints I was only able to collect data from one excavated square as a sample, 185 pieces. The observations detailed here are from my own observations and the information published by Rigaud and Texier (1981).

The Assemblage

The lithics are manufactured entirely on locally available raw materials: flint, quartz, quartzite, dolerite and sandstone. However, flint, in particular a fine-grained grey flint, dominates the assemblage (Rigaud and Texier 1981).

Bifaces are absent, and there is no indication of core preparation, with the exception of a single pseudo-Levallois core. The flakes are generally short and thick, often with a cortical edge. The butts of the flakes are typically plain and wide or cortical and the nature of the bulbs and presence of incipient cones is consistent with hard hammer flaking (Rigaud and Texier 1981).

	flint		quartz		Total	
Flaked Piece	21	11.4%	0	-	21	11.4%
Flake	113	61.4%	1	100%	114	61.6%
Retouched	19	10.3%	0	-	19	10.3%
Debris	31	16.8%	0	-	31	16.8%
TOTAL	0	184	1	100%	185	

Table 5.19. Assemblage composition for Les Tares.

	Count	Table N %
Non-PCT cores	20	95.2%
Non-PCT cores fixed perimeter	1	4.8%

Table 5.20. Flaked pieces for Les Tares

The high levels of debris are consistent with *in situ* knapping. This is also reflected in the distribution of flake Toth-types observed in my sample (See figure 5.15) where flakes with some cortex on their dorsal surface (Toth type 5) dominate.

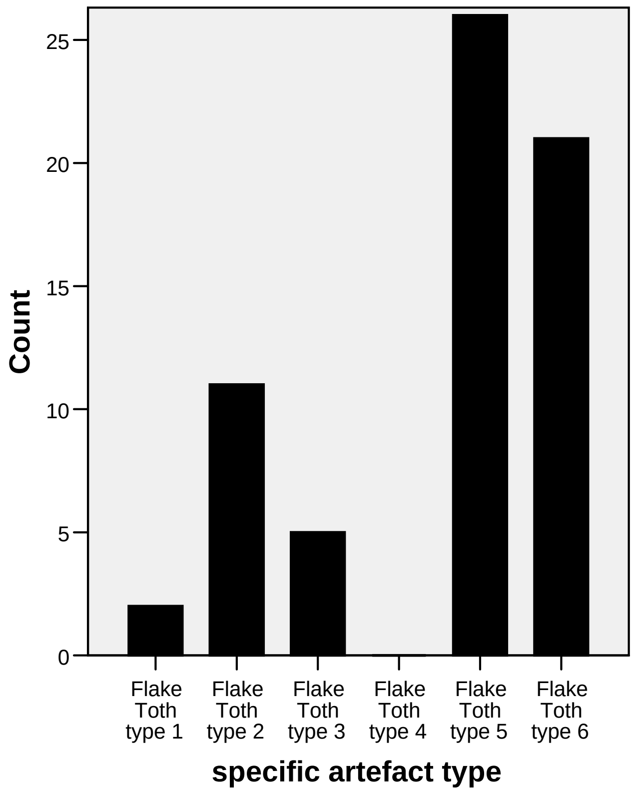

Figure 5.15. Flake Toth type for Les Tares

	Length (mm)					
	Mean	Maximum	Minimum	Range	Standard Deviation	Count
Flaked Piece	70.1	111.0	45.0	66.0	15.87	21
Flake	48.0	96.0	3.0	93.0	14.69	114
Retouched	61.8	83.0	47.0	36.0	10.56	19

Table 5.21. Artefact size (mm) for Les Tares

	Number of flake scars					
	Mean	Maximum	Minimum	Range	Standard Deviation	Count
Flaked Piece	5.8	9.0	1.0	8.0	1.97	21
Flake	2.2	6.0	.0	6.0	1.18	114
Retouched	3.3	7.0	1.0	6.0	2.06	19

Table 5.22. Flake scars by artefact type for Les Tares

The retouched tools according to Rigaud and Texier are dominated by scrapers, notches and denticulates. My observations support this although with a higher incidence of non-diagnostic retouch. No retouched notches were observed but a high proportion of the retouched pieces (23.8%) were flaked flakes, artefacts which would have been described as notches by Rigaud and Texier. It is also possible that some of the artefacts within my 'undiagnostic category' were described as denticulates by Rigaud and Texier (I have a stricter denticulate category – see Chapter 2). The retouch itself is not very intensive, typically plain. Rigaud and Texier suggest that the fine nature of some of the retouch may indicate the use of a soft hammer although I did not observe any evidence for this in the sample I studied.

	Count	Table N %
Denticulated edge	1	4.8%
Side scraper	5	23.8%
Retouched – non-diagnostic	6	28.6%
Flaked flake or flaked flake spall	5	23.8%
Multiple tool	2	9.5%
Utilised flake	2	9.5%

Table 5.23. Retouched tool types

In conclusion, Les Tares is a fascinating site. It appears to represent an open air, short lived occupation in a marshy area by hominins drawn to that spot by the resources available. Such a locality would not have been particularly hospitable and it is unsurprising they did not appear to have stayed very long. From my limited observations the assemblage is similar to the Clactonian in that it consists of large simple flakes, produced by alternate flaking, retouched simply into scrapers and flaked-flakes. Similarities between the retouched tool assemblage of Les Tares and High Lodge, Suffolk, have been noted by a number of researchers (Ashton and McNabb 1992; Rigaud and Texier 1981), in particular the presence of flaked flakes and approaches to core preparation. However, the reported presence of soft hammer retouch and more elaborate retouch is different from the Clactonian assemblages. Unfortunately, it exists in isolation and it is difficult to see any regional pattern emerging. It will be interesting to see if any similar sites are discovered in this region in the future.

The site is tentatively dated to MIS 9 and the lithic assemblage consists of a medium to large flake technology on flint. The hominins occupied an open air locality at the edge of a swampy lake. There are some similarities to the Clactonian technologically and in terms of context but it isifferent from the Clactonian in terms of elaborate retouch and flaking strategies. There are no handaxes or evidence of their manufacture.

Northern France and the Paris Basin

Northern France is the area most familiar to British researchers with its large river terraces and secondary and disturbed context sites within fluvial terrace deposits. This is an area which is generally rich in handaxes and home to the Septrional or Northern Acheulean. Although several undated finds of pebble tools have also been made (see reports from De Lumley 1976) these could equally relate to more recent Holocene activity as the majority have been surface finds. More convincing numbers of artefacts have been found at sites such as La Pointe-aux-Oies, Wimeraux, where numerous pebble tools are reported associated with remains of *Elephas primigenius* and *Hippopotamus major* eroding out of gravel deposits in the cliff (Delporte 1976; Bourdier 1976). However dating of this material is problematic.

There are a number of further non-biface assemblages within this area, firstly historic finds from the Le Havre littoral area and secondly the recently investigated deposits at Soucy in the Paris Basin, both of which are discussed in more detail below.

Le Havre Littoral:

Figure 5.16. View of the Le Havre littoral area from the Portsmouth-Le Havre ferry. The Station Romain is located in the vicinity of the white building to the right of the picture, the locations of Stations sous-Marines are spread to the left of this along the shore (photo H. Fluck).

The Le Havre littoral sites were first identified in the 1880s (Romain 1893, 1904) and the presence of an Acheulean site at what is now known as Station Romain was first reported by Romain in 1914. Later the Abbe Breuil identified the Stations sous-Marines assemblages as Clactonian from their large flakes with prominent bulbs of percussion (Breuil 1932). The artefacts were recovered along the shoreline at low tides, often following storms. Stations sous-Marines findspots are scattered the length of the shore from an area just north of the port beyond the Cap de le Havre. The Station Romaine is located at the eastern end of this beach just north of the modern port. Although extensive collections of artefacts were made from a number of findspots in this area, many were lost during the Second World War. This is unfortunate, as there were reportedly some 600 artefacts from Station Romain, 40% of which were handaxes (Ohel and Lechevalier 1979: 87). Faunal remains of *Elephas primigenius*, *Elephas antiquus*, and *Bos* sp. were also recovered and Station Romain was interpreted as a camp or home base site. The numerous smaller sites to the north of the Station Romain site which make up the Stations sous-Marines were discovered a little later by Duteurtre in the late 1920s (Ohel and Lechevalier 1979). The artefacts from these localities were described as larger and more crudely knapped by Breuil who assigned them to the Clactonian. Interestingly Ohel and Lechavalier (*ibid*) note that de Mortillet (the grandfather of French Palaeolithic research) commented, on seeing the artefacts, that they were the same as those from Station Romain. Apparently similar large flakes had been found by Duteurtre at Station Romain but had not been retained (*ibid*).

What remained of the assemblages was studied by Milla Ohel and Claude Lechevalier in the 1970s (Ohel and Lechevalier 1979). The authors concluded that the material from this area represented an Acheulean occupation over several kilometres with the ‘Clactonian’ sites representing those areas where material was being gathered and roughed out before being transported back to the campsites such as Station Romain. For these authors the material was eroding from submerged terrace deposits.

The stratigraphy of this site is extremely uncertain and given that the artefacts were collected from the shore, rather than excavated, makes it difficult to ascertain whether or not these artefacts do indeed represent a single, contemporaneous assemblage. Today, having visited the site, it appears that the areas from which these finds were made are below modern beach levels. There are some similarities with the interpretation of the southern British site of Rainbow Bar where collected artefacts have also been interpreted as eroding from submerged fluvial terrace deposits (Hack 1998, 1999, 2000, 2004, 2005). However, as at Rainbow Bar the cliffs are capped with Pleistocene gravel deposits which could equally be the source of the artefacts. The lost material and incomplete collections make it difficult to draw any secure conclusions from the Le Havre littoral sites. While many of the artefacts are indeed Pleistocene, the presence of distinct zones of contemporaneous assemblages is difficult to prove. Further investigation into the gravel deposits capping the cliff could prove significant in understanding these assemblages.

In summary my interpretation of the Stations-sous-Marines is as a series of handaxe and non-handaxe locations in the same area associated with fluvial gravels. The dating is problematic but probably Middle Pleistocene. Although the information about the assemblages is limited the size of the non-biface assemblages are probably not large enough to be identifiable as similar to the Clactonian.

Soucy

The Palaeolithic occupation sites at the Soucy quarry were discovered during gravel extraction in the Yonne valley some 120km south east of Paris. As with so many Middle Pleistocene 'sites', it is in fact a locality with a number of sites consisting of stone tools and associated faunal remains. Since the quarry was opened in 1990, nine archaeological horizons have been identified across 6 sites, four of which have been excavated (Soucy 1, 3, 5 and 6) and two of which have been preserved *in situ* for excavation at a future date (Lhomme 2007). Stratigraphic, biological and radiometric dating places these sites between c.345 and 365 ka (*ibid.)*.

The sites are located within an alluvial deposit 20m above the modern riverbed that consists of a fine sediment filling channel systems within flint gravel. Radiometric dates (ESR and U-Th) suggest that the fine upper sediment correlates to MIS9 and the flint pebble gravel to MIS10 (Chausse *et al.* 2004; Lhomme 2007). The excavators have been able to place the sites within a topographic and ecological context. The malacofauna suggests that the climate was more continental than today, with gradually retreating woodland as the valley dried out through the sequence (Limodin-Lozouet 2001). It is suggested that this could relate to the final stages of an interglacial with hominins using semi-forested areas at the edge of the river valley. The fine sediments relate to the earlier channels of the Yonne as it migrated from west to east. The occupations are associated with different stages in the rivers lifecycle but during the period in which the river dried out sufficiently for a soil horizon to form there does not appear to be any human occupation. The oldest of these channels is roughly 120m across and contains site 6 in collapse deposits from one of its banks. The most recent assemblage (Soucy 5 level 0) is associated with the renewed fluvial activity after the dry spell in which the soil horizon formed. The fauna from the upper fine channel sediment is abundant and includes *Bos primigenius*, *Bison sp.*, *Cervus elaphus*, *Dama dama clactoniana*, *Megaloceros sp.*, *Capreolus capreolus*, *Sus scrofa*, *Equus mosbachensis*, *Dicerorhinus mercki*, *Palaeoloxodon antiquus*, *Mammuthus trogontherii*, *Ursus arctos*, *Canis lupus* and *Castor fiber.*

Assemblage

The assemblages are described based upon publications to date, principally Lhomme 2007. They are described here in chronological order.

Soucy 6 is the oldest occupation and is represented by 18 lithic artefacts and fragments of bone from large herbivores. The lithics were knapped from locally-available flint pebbles, and refitting indicates that at least some knapping occurred at this locality. Of the 26 retouched tools found, the majority were denticulates (11) with some notches (7) and other non-diagnostic retouched flakes (8). The artefacts are reported to be in a poor condition but alternate flaking is believed to be the dominant knapping approach.

Soucy 5 level II appears to consist of an occupation floor only part of which has been excavated. Nearly 1500 lithic artefacts have been recovered and a large number of faunal remains, some of which display anthropogenic marks. The excavators describe how the flint pebbles that were being knapped at this level were heaped together in ‘knapping areas’ and appeared to be from a source other than the river. The majority of the lithics from this level were connected to biface manufacture, although only one handaxe roughout was recovered from this horizon. There were very few retouched pieces, manufactured using alternate flaking or discoidal flaking techniques. This would appear to be consistent with the assemblage resulting from handaxe manufacturing activities.

Soucy 5 Level I represents another large area of hominin activity with over 1500 flint artefacts and over 2000 faunal fragments. The faunal assemblage is dominated by deer and from the high incidence of cutmarks is attributed to hominin activity. The lithics were manufactured on local flint pebbles and a high number of refits suggests that this assemblage is more or less *in situ*. The flaking is again dominated by alternate and discoidal techniques, and the retouched tools, where found, are simple scrapers, denticulates and notches. The flake tools appear to have been manufactured, used and discarded at the site. Fragments from broken bifaces and thinning flakes show that bifaces were used at the site but were not discarded there. The occupation at Soucy 5 level I was a wooded river bank at low water, probably in early summer (Lhomme 2007).

Soucy 3 Level P is the largest of the archaeological horizons excavated, with over 6000 stone artefacts and over 20,000 bone fragments. The site is on the slope of a slight hill within an open woodland environment at the edge of a river. Horse dominate the faunal assemblage with significant quantities of bovid and red deer. There are also a large number of shed antlers (40) which the excavators believe to have been accumulated by the hominins. The lithic assemblage at this site includes nearly 300 handaxes along with a large number of flake tools, however only 3 cores have been recovered. There is some evidence that handaxes were knapped at the site, but the majority appear to have been brought in partially finished if not completed.

Soucy 1 also has a large lithic assemblage (over 2000), although this includes a collection of nearly 300 un-worked pebbles. The faunal assemblage includes aurochs and red deer. Both biface and flake tool technologies are present and Lhomme has argued that there is evidence that the bifaces at this locality were used for working plant material (2007).

Soucy 3 Level S, Soucy 4 and Soucy 5 Level O are all believed to be contemporaneous, resulting from hominin activity on the floodplain. There is little evidence for *in situ* knapping, and bifaces are present.

Soucy 2 has a small lithic assemblage of c. 250 artefacts, largely consisting of flake and flake tools, particularly denticulates and notches. This area has only been partially excavated, and so is not fully understood, but it appears that bifaces are absent.

For the excavators the Soucy localities tell a story of successive hominin occupations in a fluvial landscape. Many of the occupations show distinctive patterns of behaviour which appear to indicate areas of behavioural specialization, and it is possibly similar to what was happening at Le Havre and Wimereaux. For these researchers the sites which lack handaxes are simply related to those areas where activities were occurring where handaxes were not made or needed. While the presence of handaxes in nearly all the assemblages makes this a different situation to the Clactonian in the UK, the scenario is a familiar one. Until the reinvestigation of Barnham St Gregory which revealed a similar technological variability across a palaeo-landscape, the site was believed to be an example of the Clactonian. Although certain aspects of the knapping techniques and retouched flake tools are similar, discoidal flaking strategies are not observed in the Clactonian assemblages.

The soucy sites represent repeated human occupation in changing river valley during MIS10/9. There are localized handaxe manufacture and use sites and sites where handaxes were not made or used. The discoidal flaking strategy and presence of biface technology make it different from the Clactonian.

Southern France and the Mediterranean

Caune de l'Arago

Caune de l'Arago is located at the eastern edge of the Pyrenees c. 30km northwest of the town of Perpignan. The cave itself measures roughly 30m by 10m and contains at least 15m of deposits which have been subject to excavations, which are ongoing, under the direction of Henry de Lumley since 1964. The entrance of the cave opens to the east at c.200m above the current sea level, and overlooks the Tautavel plain which itself is situated c.80m above the River Verdouble. The cave has yielded a rich archaeological and palaeontological record, including over 170,000 lithics, from over fifteen stratigraphic horizons, the majority of which date to the Middle Pleistocene. The cave was occupied by hominins in both warm and cool climatic phases, and analysis of the archaeological material has enabled some interesting studies of the changing human occupation throughout the Middle Pleistocene. The site contains levels both with and without bifaces, making it of particular interest for this study. Low in the sequence finely-made quartzite handaxes have been excavated (level P. See photo 1, page 194 de Lumley and Barsky 2004), where as in certain higher levels (e.g. K, M, N, O) handaxes are entirely absent.

Stratigraphy

The archaeological horizons have been grouped into 'Ensembles' on the basis of stratigraphy and they are briefly described here from top to bottom. The sequences is sealed at the top by stalagmitic deposit which has been dated to c. 35kya (Byrne 2001). **Ensemble V,** which includes archaeological levels A and B, has been dated to c. 92kya (de Lumley *et al.* 1984) and from the faunal remains, pollen analysis and sedimentology it has been correlated to MIS 5 and 6. The lithic industry of this level is described as Middle Palaeolithic (Byrne 2001, 2004) and characterised by discoidal knapping with more intensive use of the raw material than lower levels. **Ensemble IV**, which includes archaeological level C, is dated to MIS 7 (de Lumley and Barsky 2004). It consists of stalagmitic layers formed during warmer wetter periods alternating with silt/gravel layers of colder periods. The faunal and lithic remains from this level are sparse and the animal bones extremely fragmented making them difficult to identify. There is some evidence for burning in the remains from this level which might be consistent with humanly controlled fire (Byrne 2001). **Ensemble III**, which includes archaeological levels D to G, is believed to correlate to either MIS 10 or 12 (Byrne 2001), from current analysis however the excavators have dated this unit to MIS 12 (de Lumley and Barksy 2004). The base of Ensemble III, archaeological Level G, sees a very cold climate which warms through the upper levels of the ensemble to Level D which correlates with a period of open grassland with Mediterranean trees and flora. Level G is the largest archaeological unit and the deposits seem to have resulted from long stays in the cave or repeated seasonal use. **Ensemble II**, which includes archaeological levels H to J, is believed to correlate to MIS 13 with a warm and humid climate and consists of interstratified sandy-clayey silts. The occupation seems to have consisted of short stays, with a possible seasonal use reflected in Level J. **Ensemble I**, which includes archaeological levels K to S, has been correlated to MIS14, although the lower levels are still under investigation. The deposits consist of alternating beds of sand and silt and the assemblages appear to reflect use as a short stay hunting camp (Byrne 2001).

Lithics

The lithics, which make up the majority of the material excavated from the cave, are generally in good condition with little sign of rolling, although some of the flint artefacts have suffered desilification and some of the limestone has also suffered some post depositional chemical alteration. The greatest proportion of the lithic material collected is debris, indicating that knapping was taking place at the site.

Raw material:

A wide range of raw material types are represented at Caune de l'Arago, most of which can be found in the nearby river Verdouble, some rocks come from further afield with a few fragments from up to c.30km (e.g. Wilson 1988). For the Ensemble I archaeological levels nearly all the raw material has come from within 5km of the site; the proportion of material from further afield increases in the more recent levels, although it is notable that Level H has 13% of its raw material from greater than 20km away – a level only represented in the much more recent Ensemble IV and V levels (de Lumley and Barsky 2004: 193, Fig 2). The main raw materials which come from further afield are the finer-grained flint –like rocks which are particularly selected for retouched tools. These rocks are also brought to the site already worked, unlike the more local rocks which are worked in the cave.

Level	Ensemble	MIS	Date	Climate	Biface	Pebble tool	Tool type	Stratigraphy	Fauna	Summary
	VI		35kya U-series[a]		No	No		Stalagmitic layers		No artefacts
A		4	92kya U-series[b]	Alternating warm-wet & cold-dry	No	No	High proportion of notched tools, fewer convergent retouched pieces and higher proportion of retouch to unretouched flakes	Alternating stalagmites and gravels	Fragmented bones difficult to identify	Short hunting camp. Middle Palaeolithic assemblage. Charcoal and burnt bone.
B	V & IV	7		Wet	No	No				
C		7	320-195kya U-series[a] although some older [b]	Alternating warm & wet with cold & dry	No	No		Around ten stalagmitic layers	Fragmented bones difficult to identify	Short hunting camp. Few artefacts or bones. Some evidence for fire (burnt bone and charcoal).
D	III	12	>350kya[a]	Cold & dry	yes	rare	Discoidal technique and more intensive knapping	Warm climate	Mouflon stops at top of this level, replaced by Capra ibex. Felis silvestris and rare large herbivores.Hystrix cf. cristata	Transitional level. Temporary seasonal hunting campl
E				Cold & dry	Yes	yes		Slight warming compared to F	Mouflon (70%), horse & thar dominate. Bison priscus, Praeovibos priscus also present. Carnivores (wolf, fox, cuon, lynx & panther)	Temporary seasonal hunting camp. Some evidence for selective hunting of small bovids.
F			430kya+/- 85ka ESR [c]	Very cold & dry.	rare	yes		Cold and dry climate	Mouflon (74%) with Cervus elaphus, Equus caballus mosbachensis. Thar, Praeovibos priscus reindeer and rhino are rare. Carnivores (wolf, fox, cuon, lynx & panther)	Seasonal camp for selective hunting of small bovids. Autumnal hunting of thar, summer and autumn mouflon.
F G				Cold & dry	No	yes			Praeovibos priscus, Ovis ammon antique, Bison priscus, Cervus elaphus, Stephanorhinus hemitoechus, Equus caballus mosbachensis & Hemitragus bonali. Carnivores (wolf, fox, cuon, lynx & panther)	Short occupation of the cave for specific hunting.
G			455kya+/-210 ka gamma spectronomy[d]	Cool to cold & dry	Yes	Yes	Notched tools more frequent than preceeding levels. Base has more flint, large pebbles & antler. Very diverse.	Cooling at base warming to top.	Horse,rhino, bison, muskox, elephant, thar, mouflon, reindeer & red deer. Carnivores (wolf, fox, cuon, lynx & panther)	Largest assemblage & very diverse (activities & raw materials). Long habitation non-specific hunting large herbivores.
H	II	13	480kya[e]	Mild & humid	No	rare		Interstratified sandy-clayey silt deposited in warm and humid phase cooling to	Cervus elaphus & Dama dama abundant	Short hunting episode
I			500kya[e]		No	rare				Short hunting episode
J			530kya[e] c.500kya[b]		Rare	rare	Evidence for soft hammer use.		Cervus elaphus, Dama dama, Rangifer tarandus & rare bison, horse, musk ox,	Temporary seasonal camp. Human occupation alternating with bear

								J.	mouflon, thar. All highly fractured. Some bear.	hibernation. Dental evidence suggests deer hunting in autumn.
K	I	14	530kya[e]	Cold phase	No	rare		Sandy matrix deposited in cold phase. Alternating sand & silt beds.	Reindeer	Hunting camp
L			550kya[e]		Rare	rare			Reindeer	Hunting camp
M			570kya[e] c.550kya Amino acid[b]		No	rare			Ursus denigeri, Mouflon (Ovis ammon antiqua) and other carnivores	Very thin levels grouped together
N					No	rare				
O					No	rare	Few lithics			
P					Yes	rare				
Q					Yes	rare	Evidence for soft hammer biface thinning		Horse, bison, mouflon and reindeer. Cave bear at base of this level.	Still under excavation

Table 5.24: Table summary of archaeological levels and Ensembles at Caune de l'Arago. After (Byrne 2001, 2004, de Lumley and Barsky 2004). [a] (Byrne 2001), [b] (de Lumley *et al.* 1984), [c](Falguères, Yokayoma, and Quaegebeur 1988), [d](Yokayoma and Nguyen 1981), [e](de Lumley and Barsky 2004)

The most common raw material is a milky quartz which makes up >40% of flake tools, 50% of cores, nearly all the worked pebbles and 75% of the flakes. It is difficult to work as it can break in unpredictable ways and bipolar percussion is often applied. The hominins probably gathered pebbles of this quartz from the banks of the River Verdouble, although the quartz outcrops on mount Tauch which is drained by the Verdouble.

A hyaline quartz is the next most common raw material which can be found in the Tet valley c.20km from Arago although it is also found in the Verdouble and in deposits at the base of the cave. 17% of flake tools are in this material and c. 10% of cores although it is rarely used for pebble tools. Quartzite makes up one fifth of the retouched tools and unretouched flakes, and 15% of the cores. Several of the bifaces are also made in quartzite. Seven types of quartzite have been identified all of which are abundant in the floodplains of the Têt and Soulatgé c.20km west of Arago. Pebbles of quartzite can also be found in the Verdouble.

The flint-like raw materials includes jasper, chert, shale and chalcedony, and make up 15% of the flake tools, 15-20% of the flakes, <10% of the cores and c. 5% of the total lithic assemblage. The flakes are rarely cortical and have a high number of dorsal scars indicating that the flint was mostly preworked before being brought to the cave. The flint-like material is difficult to source but the sources of some types have been. A brown jasper which is particularly good to work comes from Corneilla-de-Conflent, and is abundant in the Têt terraces between 16 and 20km from Caune de l'Arago. A black lydienne is found on the floodplains of the Têt and the Verdouble, dispersed through the region, and shale plaquettes can be found c. 6km from the site.

Sandstone-quartzite, a sandstone which is rich in quartz, makes up c.5% of retouched tools, nearly 11% of cores and almost 20% of pebble tools. Pebbles of this material can be found in the Verdouble.

Limestone makes up less than 15% of the retouched tools and c.25% of unretouched flakes which are mostly cortical. The Verdouble is very rich in limestone and is the likely source for this raw material.

Sandstone makes up less than 1% of retouched tools, <2% flakes and <3% cores. It is also present in the Verdouble.

The raw material does not seem to affect the way the material is knapped but does seem to have affected the type of object being manufactured and the correlation between particular rock types and certain artefact types appears to be consistent throughout the stratigraphic sequence. For example limestone is favoured for the manufacture of ‘heavy’ industry (pebble tools, hammerstones, choppers etc) while fine grained flint-like rocks are preferred for retouched tools (de Lumley and Barsky 2004). The bifaces are usually made on a quartzite which is found c. 15km from the site (*ibid*.), e.g. see photo 1 de Lumley and Barsky 2004:194. This relationship between rock types and tool types where a range of raw materials is available is observed at many other Lower Palaeolithic sites, e.g. Isernia la Pineta (Peretto 1994), Atapuerca (see next chapter), Menez Dregan (this chapter), Terra Amata (Villa 1983). For the most part a preference is shown for the use of finer grained raw materials such as flint for retouched tools while the heavier tool types such as pebble tools are made on coarser raw material such as quartzite.

The dimensions:

Dimensions are not given in the publications for artefacts other than retouched tools; however, as it is reported that it is the larger flakes which are selected for retouching the data give a good idea of the size of artefacts overall. The retouched tools are small, rarely exceeding 50mm in length with most falling between 20 and 40mm. The larger tools are generally manufactured on limestone, sandstone-quartzite, and quartzite with the smaller on hyaline quartz. Tools larger than 100mm are extremely rare.

Layer	Raw material	<20mm	21-30mm	31-40mm	41-50mm	51-60mm	61-70mm	71-80mm	81-90mm	91-100mm	>100mm	Total %
D	Milky Quartz	7	47	27	13	4	2					100
	Hyaline Quartz	12	42	30	12	3						100
	Sandstone-quartzite		64	18	9					9		100
	Quartzite	9	35	35	20	2						100
	Flint	32	47	18	4							100
	TOTAL	15	45	26	11	2						100
E	Milky Quartz	4	30	33	22	4	7					100
	Hyaline Quartz		55	25	10	5		5				100

	Sandstone-quartzite		11		33	22	33					100
	Quartzite	8	35	27	12	15	4					100
	Flint	11	39	36	7	7						100
	TOTAL	5	36	28	15	9	5	1				100
F	Milky Quartz	1	32	36	18	8	4		1			100
	Hyaline Quartz	4	23	37	21	10	6					100
	Sandstone-quartzite		3	13	41	16	19	6	3			100
	Quartzite	4	15	31	27	14	7	2				100
	Flint	7	25	32	25	6	1	1				100
	TOTAL	4	21	32	25	10	6	1	1			100
F/G	Milky Quartz		8	54	23	15						100
	Hyaline Quartz		36	36	27							100
	Quartzite	5	18	41	9	23	5					100
	Flint		23	62	15							100
	TOTAL	2	20	47	17	12	2					100
G	Milky Quartz	1	17	36	26	9	7	2		1	1	100
	Hyaline Quartz	4	25	37	17	7	6	4				100
	Sandstone-quartzite		9	14	25	19	22	6	3	1	1	100
	Quartzite	2	20	32	23	15	5	2				100
	Flint	5	19	35	23	9	6	2				100
	Limestone			8	17	42	8			8	17	100
	Sandstone		5	11	26	21	21	11	5			100
	TOTAL	3	19	32	23	12	8	3	1			100
H	Milky Quartz		6	24	18	47	6					100
	Hyaline Quartz		25	25	25	17				8		100
	Sandstone-quartzite			25	25	17	25	8				100
	Quartzite	6	24	21	30	6	6	3	3			100
	Flint	2	27	23	30	9	5	2	2			100
	TOTAL	3	10	23	27	15	7	3	2	1		100
J	Milky Quartz	5	8	33	38	13	3					100
	Hyaline Quartz	5	35	40	15	5						100
	Sandstone-quartzite		3	26	19	23	6	16	3		3	100
	Quartzite	8	13	23	20	13	13	8	2			100
	Flint	4	4	22	29	33	6	2				100
	TOTAL	5	10	27	25	19	7	5	1			100

Table 5.25: Table showing percentage of tool size by group for raw materials by layer. Data from Byrne 2001, only available for levels D to J. Grey highlights the most frequent.

Raw material	Length (mm)	Width (mm)	Thickness (mm)
Limestone	67.1	66.8	26.8
Sandstone	52.3	49.7	17.9
Sandstone quarzite	51.7	50.9	18.5
Hyalin Quartz	36.3	33.8	15.0
Milky Quartz	38.8	37.2	17.2
Quartzite	40.2	36.9	15.6
Flint	36	34.8	12.7
overall	39.9	37.8	15.5

Table 5.26: average length of retouched pieces for all levels by raw material (after Byrne 2001:73).

	Pebbles (whole and broken)		Flakes pieces		flakes		Retouched		Debris		total	
	N	%	N	%	N	%	N	%	N	%	N	%
A to C	45	4.7	157	16.6	349	36.8	397	41.9	-	-	948	
D	141	4.7	207	6.9	1817	60.2	854	28.3		-	3019	
E	209	12.3	144	8.5	893	52.4	458	26.9	-	-	1703	
F	668	10.6	269	4.3	4037	64.2	1311	20.9	-	-	6285	
FG	139	9.2	59	3.9	1117	73.6	203	13.4		-	1518	
G	2492	12.1	1317	6.4	13232	64.1	3619	17.5	-	-	20656	
H	261	15.0	98	5.6	1013	58.3	365	21.0	-	-	1737	
I	79	10.3	32	4.2	456	59.6	198	25.9	-	-	765	
J	361	6.9	135	2.6	3903	74.5	839	16.0	-	-	5238	
K	41	5.5	24	3.2	658	88.4	21	2.8	-	-	744	
L	98	7.6	44	3.4	1049	81.2	101	7.8	-	-	1292	
M to Q	72	9.1	60	7.6	508	64.1	153	19.3	-	-	793	
Total									-	-	44702	

Table 5.27: Caune de l'Arago basic artefact types by archaeological level. Data from (de Lumley and Barsky 2004).NB no data available for debris (grey indicates NBA levels).

	Scraper		Denticulate		Bec		Piercer		burin		convergent		Retouched notch		Backed knife		Multiple tools		Flaked flake		Non-diagnostic		TOTAL
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	
A	4	36.4	2	18.2	1	9.1	-	-	-	-	-	-	1	9.1	-	-	-	-	3	27.3	-	-	11
B	23	37.7	4	6.6	5	8.2	1	1.6	-	-	-	-	10	16.4	-	-	5	8.2	12	19.7	1	1.6	61
C	135	41.7	36	11.1	16	4.9	-	-	1	0.3	4		51	15.7	-	-	33	10.2	45	13.9	3	0.9	324
TB	200	87.3	34	9.3	3	0.8	2	0.5	-	-	11	3	43	11.8	-	-	26	7.1	37	10.2	8	2.2	364
TBM	111	48.5	10	4.4	8	3.5	-	-	-	-	4	1.7	35	15.3	-	-	27	11.8	31	13.5	3	1.3	229
D	392	46.1	93	10.9	42	4.9	4	0.5	-	-	10	1.2	116	13.6	-	-	90	10.6	98	11.5	6	0.7	851
E	211	46.4	48	10.5	19	4.2	2	0.4	-	-	6	1.3	57	12.5	-	-	70	15.4	41	9	1	0.2	455
F	655	50.2	124	9.5	38	2.9	9	0.7	1	0.1	29	2.2	144	11	-	-	223	17.1	78	6	3	0.2	1304
FG	98	48.3	19	9.4	6	3	-	-	-	-	-	-	29	14.3	-	-	36	17.7	15	7.4	-	-	203
G	1728	47.9	389	10.8	142	3.9	22	0.6	5	0.1	56	1.6	407	11.3	-	-	637	17.7	214	5.9	7	0.2	3607
H	204	56.2	40	11	10	2.8	1	0.3	1	0.3	10	2.8	35	9.6	1	0.3	49	13.5	12	3.3	-	-	363
I	129	65.2	9	4.5	8	4	-	-	-	-	2	1	13	6.6	-	-	31	15.7	6	3	-	-	198
J	497	59.7	67	8	34	4.1	2	0.2	2	0.2	14	1.7	58	7	1	0.1	117	14	41	4.9	-	-	833
K	12	57.1	3	14.3	1	4.8	-	-	-	-	-	-	-	-	-	-	4	19	1	4.8	-	-	21
L	57	55.9	13	12.7	3	2.9	1	1	1	1	1	1	10	9.8	-	-	10	9.8	6	5.9	-	-	102
INF	79	52	12	7.9	2	1.3	-	-	1	0.7	3	2	13	8.6	-	-	35	23	7	4.6	-	-	152
																							9078

Table 5.28: Retouched tools by archaeological level. Data from Byrne 2001: 84 and 85, table 17 (grey indicates NBA levels).

Flakes and retouched flake tools dominate the assemblages from all the archaeological horizons at Caune de l'Arago (see table 5.27). Flaked pieces are more numerous in the upper levels, making up 16.6% of the assemblage in levels A to C (where handaxes are absent), but generally they make up less than 10% of the assemblage.

The retouched tools are dominated by scrapers in all levels. There is also a high incidence of multiple tools – possibly indicating a certain level of reuse. Denticulates are present in varying numbers and notches seem to increasing number in the upper levels.

In conclusion the inter-layering of levels with and without bifaces at Caune d'Arago is interesting. The upper levels appear to relate to a Middle Palaeolithic flake-based industry and we see the introduction of discoidal flaking at this point with an increase in core preparation. The lower levels however, Ensembles I-III which have been dated to between MIS14 and MIS10 seem to relate more closely to the NBAs of this study. However, handaxes are present, albeit in low numbers, intermittently. Interestingly there appears to be a correlation between the absence of handaxes and the short-term occupation assemblages. This would seem to imply a behavioural explanation for the absence of bifaces that is linked to the way in which a site is used – that certain types of occupation simply do not need or involve handaxes.

The long sequence at Arago is also a fine example of the 'longue duree' that is widely observable in and has so influenced French Palaeolithic research. The excavators believe that the changes in lithic technology and the emergence of the Middle Palaeolithic flake-based technology have a continuity with the earlier levels of the cave. It is another example of the 'mousterianisation' process in action. This makes it quite different from studying the Clactonian where the assemblages are not observable as moments in a continuum. There may be some interesting correlation however in the nature of occupation, and a trend that can perhaps be supported by observations from Les Tares and Soucy: namely that different types of occupation leave different assemblages and that assemblages without handaxes tend to be associated with shorter occupations.

Caune de l'Arago is a cave site,with a long occupation sequence consisting of occupation horizons both with and without handaxes. The dating of the lower levels is pre-MIS9, probably MIS14-MIS10, and has been confirmed by different absolute dating techniques.There are a variety of raw materials present that have been differentially used. The NBAs seem to be associated with short occupations.

Conclusion

The Lower Palaeolithic from France is undoubtedly rich and the interpretation of its assemblages has been internationally influential. In terms of NBAs a number of interesting pattern emerge. The Colombanian does indeed appear to be a geographically discrete phenomenon of flake tools and worked pebbles in the coastal areas of Brittany, although rare handaxes are present. For most French researchers, however, this is simply a facies of the Acheulean; as Jean Laurent Monnier put it - it is simply what the Acheulean people were doing at the coast (pers. comm. 2006). However, such flexibility to the definition of the Acheulean is hardly surprising for an area which has entertained two versions of the Acheulean, the Septrional and Meridional, for so long. In France the Acheulean is not monolithic, or cultural, but rather a flexible technocomplex which is adapted to circumstances, whether functional, situational or in terms of available resources. Occasionally this may mean that handaxes are not produced.

Interestingly, there are few sites where bifaces are completely absent in the way that they are from Clactonian assemblages are in the UK. There are handaxes in Brittany, albeit few and far between, and there have been bifaces found in Colombanien assemblages. We can make too much of this (e.g. McNabb 1992; 1996 on bifaces in the Clactonian), but it is an important aspect of the Colombanien, and a key factor in the argument presented by the excavators that rather than a 'cultural' tradition the Colombanien is a facies of the Acheulean in its broadest sense.

Technologically the most similar sites to the British material are Soucy and Les Tares. Investigations at Soucy have revealed evidence for hominin activity through time in a changing landscape and while bifaces are rare in some of the assemblages the overall picture is one of specialist knapping and curation of bifaces, against a 'day to day' flake tool kit which on occasions was more readily discarded. As research is ongoing this is a site to be watched with interest. As well as the evidence for biface manufacturing the current dates for Soucy also set this apart from the Clactonian with the sites believed to represent occupation at the end of an interglacial, possibly MIS9.

Les Tares is a further site of interest. In some ways technologically similar to the Clactonian, it consists of large unprepared flakes, largely from alternate flaking and simple flake tools. It is an open air site and believed to date to MIS9, again making it more recent than the British material. But it occurs in isolation and it too, like Soucy, may be part of a more complex pattern of differential land use.

The cave sites are interesting but different from the Clactonian. The continuity in assemblages and occupation enables us to seean emerging trend toward flake tool assemblages which are characteristic of the Middle Palaeolithic. The concept of the Meridional Acheulean does seem to hold. However, as Paola Villa observed in 1983 the arguments for a cultural basis of this distinction are weak. The predominance of the Meridional Acheulean in cave-rich areas probably has more to do with the nature of the sites and the absence of open air localities than anything more.

Overall the French sites do not display any robust similarities to the Clactonian sites. In fact this assessment serves to highlight the unique nature of the Clactonian assemblages. However, it also serves to highlight the variation in Middle Pleistocene assemblages; while the Clactonian may be unique in its specific characteristics it is not unique in representing variability in lithic technology during this period.

Chapter Six

The Iberian Peninsula

Figure 6.1. Map of Iberian Peninsula showing locations of sites discussed.

The Iberian peninsula, surrounded by sea, is separated from the rest of Europe by the mountainous stretch of the Pyrenees in the northeast. It is tantalisingly close to North Africa and it has been argued that early hominins may well have taken advantage of this fact by travelling out of Africa across the straits of Gibraltar (e.g. Carbonell *et al.* 2008; Carbonell *et al.* 1999c; Gibert *et al.* 2001; Santonja and Villa 1990). Its peninsular nature has also lent itself to periods of isolation and it appears to have acted as a refugium at certain points in the Pleistocene; for example it appears that Neanderthals persisted in Iberia long after they had disappeared from the rest of Europe (e.g. Zilhao 1993).

With regard to Lower and Middle Pleistocene hominins it is perhaps the human remains which steal the show in the Iberian peninsula, with claims for some of the oldest hominin remains outside of Africa (e.g. the Gran Dolina and Sima de los Huesos sites in the Sierra de Atapuerca in northern Spain (Carbonell *et al.* 2008) and sites in the Guadix-Baza Basin in the south (Gibert *et al.* 2001, Gibert *et al.* 1995)). In terms of archaeological sites much field investigation has focused upon the rich cave sites which are occupied in the later Middle and Upper Pleistocene (e.g. Abric Romani, in Catalunya; El Castillo, Cantabria; El Pinar, central Spain).

The Lower Palaeolithic assemblages have tended to come from open air sites, and many of these from fluvial contexts, particularly in the central and south-western regions (e.g. Santisteban and Schulte 2007; Santonja and Perez-Gonzalez 1996; Santonja and Villa 1990). However, recent work on the Duero River basin limestone plateaus in the central Maseta region of Spain has recorded an extensive series of lithic scatters of Lower and Middle Palaeolithic date suggesting that hominin occupation in the early Palaeolithic was not restricted to river valleys (Diez-Martın *et al.* 2008). Nevertheless, the vast majority of these open air sites contain handaxes; the most famous are perhaps the sites of Torralba (MIS12-8) and Ambrona (>MIS12) two Acheulean sites with lithics and elephant remains in lacustrine/ fluvial contexts (Santonja-Gomez 2005; Villa 1990).

Of those finds described as ‘Mode 1’ most are isolated finds. As with elsewhere problems of dating these open air deposits are considerable but our understanding of the river terraces which contain these sites is increasing as similarities between the more studied terraces of rivers in north west Europe (e.g. the Thames and the Somme) and those of southern Europe are identified. For example, through the work of the IGCP project 449 (e.g. Bridgland *et al.* 2006; Bridgland and Westaway 2008a, b; Santisteban and Schulte 2007) it has been possible to correlate deposits with radiometric dates with other undated terrace deposits to build up a chronological picture of terrace formation for these fluvial systems.

Given the presence of rich cave deposits there has sometimes been a tendency for some researchers to neglect secondary context sites and to consider them to be of less interest or importance (Fernández Peris *Pers. Comm*.). The recent work on fluvial deposits described above will hopefully enable those researchers who have been pursuing these important open air and secondary context assemblages to push the significance of their findings.

Cova del Bolomor, Tavernes la Valldigna, Valencia

Cova del Bolomor is a karstic rockshelter located on the southern side of the Valldigna, a wide valley which runs east-west between the Iberic Mountain range to the north and

Monduver in the Prebetic Mountain range to the south, crossing the coastal plain to the east until it reaches the Mediterranean. The rock shelter has been open for around 400-500ky, since the erosion that created the gorge (Bolomor Gorge) in which it is located, and today it takes the form of a 'hung balcony' in the steep eastern side of the gorge. Since its formation the cave has been intermittently occupied and contains an occupational sequence dating from >300kya until its abandonment c.100kya. The palaeontological and archaeological potential of the site was first recognised in the 19th century by various local geologists who observed its breccia layers rich in fauna and stone tools. Its potential even reached the ears of the ubiquitous Abbe Breuil who visited the site in 1913 and collected material from the cave which was located in the Institut de Paléontologie Humaine de Paris 25 years later (Fernández Peris 2007). In 1925 the cave was investigated by a commission from the Colegio de Doctores de Madrid, however this investigation did not prevent the exploitation of the cave by local miners looking for large slabs of travertine for local industrial purposes. Unfortunately their efforts resulted in the destruction of a considerable area of the interior of the cave (possibly as much as 70% of the archaeological deposit according to Fernández Peris 2007). In the 1970s the Servicio de Investigación Prehistórica de la Diputación Provincial de Valencia sent a team to look at the cave and collect sediment which resulted in a small excavation of the upper level in 1977. Since 1989 the site has been excavated by a small team associated with the Servicio de Investigación Prehistórica de la Diputación Provincial de Valencia under the direction of Dr Josep Fernández Peris and, in the early years, Pere Guillem. The excavations are ongoing and continue to produce significant findings including some of the earliest evidence for the controlled use of fire in southern Europe.

Chronology, stratigraphy and climate

A detailed stratigraphic sequence has been developed for the Cova del Bolomor deposits for the period between the end of the Middle Pleistocene and the beginning of the Upper Pleistocene (c. 400-100 kya / MIS 9-5e) and also provides a palaeoclimatic reference for the western Mediterranean more generally. The seventeen stratigraphic levels form a sequence consisting of four paleoclimatic phases, from the base to the top of the sequence (Fernández Peris *et al.* 1994, Fernandez Peris, Guillem, and Martinez-Valle 1997, Fernández Peris, Guillem, and Martínez 1999, Fumanal 1993, 1995):

Bolomor Phase I (Levels XVII to XV, MIS9-8): A period of cold climate with seasonal humidity, characterised by the accumulation of exogenous material and sediment brechification. An amino-acid racemisation (AAR) date of 525,000±125kya has been obtained from Level XVIIa although other evidence (mostly faunal) suggests a date in the region of 350ka might be more reasonable.

Bolomor phase II (Levels XIV and XIII, MIS7): A period of warm and wet climate with interstadial characteristics. Dates have been obtained by thermo-luminescence (TL) on sediments from Level XIV of 233,000±35kya and 225,000±34kya, and another two TL dates from Levels XIIIa and XIIIc have given dates of 152,000±23kya and of 229,000±53kya respectively.

Bolomor Phase III (Levels XII, XI, IX and VIII, MIS6): A climatic period which begins with a cold and humid climate and changes to a more arid situation (Level XII) and ends with the emergence of a period of temperate and humid climate (Level VIII).

Bolomor Phase IV (Levels VII to I, MIS5e): A period of temperate and humid climate in the final interglacial that is generally mild but with occasional cold phases (Levels VII to III) represented in the stratigraphy by the accumulation of small pebbles. A TL date for Level II has been obtained of 121,000±18kya BP.

Figure 6.2. Location of Cova del Bolomor, looking south, (Fernández Peris *et al* 2009)

Fauna

The faunal remains from the cave are extremely rich and include fragments of human bone from Level III, Level IV, and Level XIII. Red deer (*Cervus elaphus*) is present in significant numbers in every level and Rabbit (*Oryctolagus cuniculus*) also makes up a significant part of all the assemblages. For the lower levels (Level XII to XVII) horse (*Equus feruus*) becomes the main macrofauna species; a significant change from bovid (*Bos primigenius*) in more recent levels. There is a high incidence of cutmarks on the bones and some of the *Testudo sp.* remains also show evidence of burning on the outer shells possibly indicative of cooking (Blasco 2008).

The location of the site in a gorge overlooking the coastal plain and the Valldigna valley (see Fig 6.2) make Bolomor an ideal location for short-stay hunting parties. The faunal remains certainly suggest a strongly anthropic nature of the assemblage and the high incidence of cut marks indicates that many of the animals were being processed, if not consumed at the site.

	Megafauna %	**Macrofauna %**	**Mesofauna %**	**Main species**	**Total no. frags.**	**No. indet. frags.**
Level I	1.1%	32.6%	65.9%	Cervus elaphus, Bos primigenius,Oryctolagus cuniculus, Testudo sp.	15523	12832
Level II	-	50%	50%	Cervus elaphus, Bos primigenius, Testudo sp.	1451	1364
Level III	2.6%	44.3%	51.6%	Cervus elaphus, Bos primigenius, Oryctolagus cuniculus, Testudo sp.	2206	1558
Level IV	4.1%	26.5%	68.3%	Cevus elaphus, Sus scrofa,Bos primigenius, Oryctolagus cuniculus, Testudo sp.	20954	20130
Level V	5.6%	25.3%	67.6%	Cervus Elaphus, Capridae, Bos primigenius, Oryctolagus cuniculus, Testudo sp.	5358	4024
Level VI	-	50%	50%	Cervus elaphus, Bos primigenius	84	72
Level VIII	-	100%	-	Bos primigenius	1	0
Level XII	3.4%	34.4%	62.1%	Cervus elaphus, Equus ferus	200	2
Level XIII	4.2%	13.5%	80.2%	Cervus elaphus, Hemitragus sp., Equus ferus, Orctolagus cuniculus	829	273
Level XV	2.2%	33.1%	63.9%	Cervus elaphus, hemitragus sp., Equus ferus, Orytolagus cuniculus	1962	403
Level XVII	5.7%	45.1%	47.4%	Cervus elaphus, Equus ferus, Oryctolagus cuniculus	6093	2049

Table 6.1 Fauna from Cova del Bolomor by level. Data from Fernández Peris 2007.

Fire

Evidence for hearths has been found in levels II, IV, XI and XIII of the cave (Fernandez Peris *et al.*). The majority of these have been identified from the entrance area of the cave where excavation of the lower levels is yet to be completed, and further discoveries of hearths from these lower levels (XV and XVII) would not be unexpected. The hearths are not formally structured and appear to have been the locations of small 'one-off' fires. The locations of the hearths are identifiable by localised thermal alteration of the sediment and the presence of burnt bone and charcoal. The anthropic nature of these fires has been confirmed by micromorphological and experimental studies. Interestingly, for the lower level hearths there have been very few burnt lithic fragments identified despite the sieving of all sediment recovered from the hearth areas; burnt bones with cutmarks have however been identified.

Lithics

For his doctoral thesis (2007) Josep Fernández Peris undertook a study of the lithic assemblages from all levels of the cave. In common with other NBA researchers (e.g. Vertes (Kretzoi and Dobosi 1990), Molines (1999), Querol and Santonja (1980)), Fernández Peris addressed the problem of applying an existing typological system to the atypical assemblage by developing his own typology. Largely based upon the work of French colleagues (Bordes, Tixier, Boeda, Laplace etc) this system sought to investigate the assemblage whilst recognising that artefacts may be multifunctional. However, as discussed in Chapters 1 and 2 such individual approaches can make inter-assemblage comparison difficult so the data presented here are from my own analysis using the methodology set out in Chapter 2. I was also able to include recently excavated, unpublished material and so I have been able to include all artefacts excavated to date from levels XIII, XV and XVII, and I would like to express my sincere appreciation to Dr Fernández Peris for this. For the purposes of this study only the lithic assemblages from the lower levels were studied (Levels XIII, XV and XVII); these levels fall within Bolomor Phase 1 and at the beginning of Bolomor Phase 2 (roughly MIS 9 to 7).

Overall the site is considered to present a series of assemblages with gradual changes rather than sudden alterations in the assemblage composition and the lithic analysis to date has not identified any distinctive 'archaeological cultures' (Fernández Peris 2007; personal observation). In fact the consistency in the Bolomor assemblage and the apparent absence of any great changes in lithic technology throughout its nearly 300,000 year occupation are one of its key characteristics and one of the reasons why this site was selected for this study.

Raw material

The lithic assemblages are on flint, limestone, quartzite and quartz all of which would have been locally available as pebbles in the river valley below the site and the beach deposits of the coastal plain. Flint is the preferred raw material in all levels, although varying levels of limestone and quartzite are also used (see table 6.2). For Level XIII flint makes up nearly 65% of the assemblage and quartzite (at 23%) is favoured over limestone. For Level XV the percentage of flint is similar at nearly 66% but the percentage of limestone (17.6%) and quartzite (16.2%) are much more equal. In Level XVII the preference for flint is slightly lessened as it makes up just over half of the assemblage, the remainder of which comprises almost equal quantities of limestone and quartzite. The flint, and likewise the quartzite, would have been available as small pebbles reworked from a variety of sources and for the most part appears to have come from the river deposits. The limestone is largely pebbles which are slightly larger in size than those in other materials from the river gravels; the excavators have proposed that this difference is size is because the limestone pebbles are from marine, rather than fluvial, deposits. It may be that the fall off in limestone seen in Level XIII reflects the falling sea levels of later MIS8 which would have pushed the Mediterranean coast further out of range of the Bolomor hominids.

Unfortunately some of the flint has undergone post-depositional desilification processes which have affected its preservation; there has also been some localised water erosion which has affected the condition of some of the lithics. However, for the most part the lithics are in extremely good condition and appear to be in primary context.

Dimensions

The raw material, as discussed above, consisted mostly of small to medium pebbles and this has undoubtedly had an impact on the size of the assemblage. The size of the pebble raw material is unknown although pebbles of c. 50-60mm have been observed in deposits in the valley today. The artefacts are generally small, for the most part less than 40mm. The largest artefacts at the site are manufactured on limestone (maximum length 95mm) which as discussed above appears to have been available and exploited as larger marine pebbles.

		Flaked Pieces		Flake		Retouched		Debris		Hammerstone		Total	
		N	%	N	%	N	%	N	%	N	%		
Level XIII	Flint	11	64.7	178	58.9	60	69.8	173	70.9	1	16.7	423	64.6%
	Limestone	4	23.5	45	14.9	3	3.5	22	9	2	33.3	76	11.6%
	Quartzite	2	11.8	77	25.5	23	26.7	49	20.1	2	33.3	153	23.4%
	Other	-	0	2	0.7	-	0	-	0	1	16.7	3	0.5%
	SUBTOTAL	17	3%	302	46%	86	13%	244	37%	6	1%	655	
Level XV	Flint	7	100	149	54.8	78	83.9	137	75.3	-	0	371	65.9%
	Limestone	-	0	71	26.1	2	2.2	18	9.9	8	88.9	99	17.6%
	Quartzite	-	0	51	18.7	13	13.9	27	14.8	-	0	91	16.2%
	Other	-	0	1	0.4	-	0	-	0	1	11.1	2	0.4%
	SUBTOTAL	7	1%	272	48%	93	17%	182	32%	9	2%	563	
Level XVII	Flint	3	33.3	89	48.9	40	58	57	60	-	0	189	51.9%
	Limestone	4	44.5	46	25.3	8	11.6	27	28.4	9	100	94	25.8%
	Quartzite	2	22.2	46	25.3	21	30.4	11	11.6	-	0	80	22%
	Other	-	0	1	0.5	-	0	-	0	-	0	1	
	SUBTOTAL	9	2%	182	50%	69	19%	95	27%	9	2%	364	23
TOTAL		33		756		248		521		24		1582	
	%	2.1		47.8		15.7		32.9		1.5			

Table 6.2: Numbers of basic artefact types by level and raw material (based on my data).

Assemblage composition

The assemblages from all three of the lower levels are dominated by flakes, with flaked pieces making up less than 4% of the assemblage. The presence of a large number of broken pieces and debris suggests that at least a certain amount of knapping took place in the cave (see table 6.2), although given the low percentage of flaked pieces and the distribution of flake Toth types (see below) much of the assemblage appears to have been brought in already worked. The percentage of flaked pieces is highest (at 4%) in Level XIII, whilst this level also has the lowest percentage of retouched pieces (21%). At 27% Level XVII has the highest proportion of retouched pieces.

			Length (mm)					
			Mean	Min.	Max.	Range	St. Dev.	Count
Nivel XIII	Flaked pieces	Flint	37.3	27	53	26	8.15	11
		limestone	58.8	39	95	56	25.72	4
		Quartzite	34.5	22	47	25	17.68	2
	Flakes	Flint	28.0	14	65	51	8.29	178
		limestone	40.1	20	72	52	14.39	45
		Quartzite	29.5	14	62	48	8.64	77
		Quartz	28.0	24	32	8	5.66	2
	Retouched	Flint	34.0	17	70	53	10.45	60
		limestone	36.7	33	43	10	5.51	3
		Quartzite	37.1	24	59	35	9.30	23
Nivel XV	Flaked pieces	Flint	34.4	21	50	29	9.32	7
	Flakes	Flint	24.7	10	58	48	7.28	149
		limestone	32.6	13	57	44	9.34	71
		Quartzite	27.2	15	50	35	7.54	51
		Other	28.0	28	28	-	-	1
	Retouched	Flint	31.3	18	57	39	8.28	78
		limestone	41.5	32	51	19	13.44	2
		Quartzite	34.7	20	51	31	8.67	13
Nivel XVII	Flaked pieces	Flint	35.3	34	37	3	1.53	3
		limestone	81.0	46	116	70	29.72	4
		Quartzite	36.5	33	40	7	4.95	2
	Flakes	Flint	23.5	10	60	50	8.55	89
		limestone	35.5	18	76	58	12.80	46
		Quartzite	32.2	13	65	52	13.96	46
		Other	19.0	19	19	-	-	1
	Retouched	Flint	32.9	11	64	53	11.65	40
		limestone	42.8	31	54	23	6.94	8
		Quartzite	37.3	20	53	33	8.77	21

Table 6.3: Artefact length by level, artefact type and raw material (my data).

The flint appears to have been the most intensively workedraw material in all of the levels, the flint artefacts being slightly smaller on average (see table 6.2) and having a higher flake scar average (tables 6.4 to 6.6). Flint also makes up the greatest proportion of the assemblages in all levels (table 6.2) and so seems to have been the preferred raw material.

	Flaked pieces	Flakes	Retouched pieces	Debris	Total
Bolomor XIII	17 2.6% *4%*	302 46.5% *75%*	86 13.3% *21%*	244 37.6% -	649 *405*
Bolomor XV	7 1.3% *2%*	271 49% *73%*	93 16.8% *25%*	182 32.9% -	553 *371*
Bolomor XVII	9 2.5% *3%*	182 51.3% *70%*	69 19.4% *27%*	95 26.8% -	355 *260*

Table 6.4: basic composition of lithic assemblages from Bolomor Levels XIII, XV and XVII. Percentages shown in italics do not include debris (my data).

Bolomor Level XIII: number of flake scars						
		Mean	**Count**	**Max**	**Min**	**St. Error of Mean**
Flaked pieces	**flint**	5.7	11	10	1	.87
	limestone	4.0	4	8	1	1.47
	quartzite	3.5	2	4	3	.50
Flakes	**flint**	2.6	178	6	0	.10
	limestone	1.8	45	4	0	.22
	quartzite	1.9	77	5	0	.16
	quartz	1.0	2	1	1	.
Retouched	**flint**	2.8	60	5	0	.20
	limestone	3.5	3	4	3	.50
	quartzite	2.1	23	4	0	.29

Table 6.5: number of flake scars for level XIII by artefact type and raw material (my data).

The disparity between the number of flaked pieces and number of flakes suggests certain patterns of behaviour can be inferred from the assemblages studied. In Level XIII, as discussed above, the dominant raw material is flint, followed by quartzite and limestone. When the number of flakes (including retouched flakes) is compared to the number of flaked pieces for each of these raw materials the average number of flakes each flaked piece would have to produce to result in the observed assemblage composition is 21.6 for flint, 50 for quartzite and 12 for limestone. Given the small size of the pebbles available it would be virtually impossible to produce this many flakes and the average number of flake scars observed supports this (Table 6.6-6.8). Clearly either the flakes were being brought in to the site already knapped, or flaked pieces were being retained and removed from the cave and/or discarded elsewhere. Given the presence of debris which indicates at least some knapping occurred in the cave it seems likely that it is a combination of the two. The pattern is particularly strong for the quartzite artefacts raising the possibility whether it was the flakes or the flaked pieces which were the focus of the knapping: are the flakes the result of the production of pebble tools which are being used, reworked, retained and removed from the site?

Bolomor Level XV: number of flake scars						
		Mean	**Count**	**Max**	**Min.**	**St. Error of Mean**
Flaked pieces	**Flint**	7.3	7	11	5	.84
Flakes	**Flint**	2.6	149	7	0	.11
	Limestone	1.9	71	4	0	.26
	Quartzite	1.8	51	4	0	.17
	Other	.	1	.	.	.
Retouched	**Flint**	2.7	78	6	0	.18
	Limestone	3.0	2	5	1	2.00
	Quartzite	2.7	13	6	1	.36

Table 6.6: number of flake scars for level XV by artefact type and raw material (my data).

Bolomor Level XVII: number of flake scars						
		Mean	**Count**	**Max**	**Min.**	**St. Error of Mean**
Flaked pieces	**Flint**	10.0	3	13	8	1.53
	Limestone	7.5	4	13	2	2.33
	Quartzite	6.0	2	6	6	.00
Flakes	**Flint**	3.4	89	10	1	.20
	Limestone	2.8	46	8	0	.32
	Quartzite	2.1	46	6	0	.27
	Other	3.0	1	3	3	.
Retouched	**Flint**	3.9	40	9	0	.47
	Limestone	3.2	8	6	1	.86
	Quartzite	2.6	21	6	1	.33

Table 6.7: number of flake scars for Level XVII by artefact type and raw material (my data).

For Level XV there are only flint flaked pieces with a flaked piece to flake ratio of 32.4:1, the absence of flaked pieces in the other raw materials strongly suggests that these were being retained and removed from the site.

For Level XVII the distribution of the raw material is more even and here, like for XIII, the limestone has the lowest flake to flaked piece ratio at 13.5:1, quartzite and flint higher at 33.5:1 and 43:1 respectively. Again either large quantities of flakes were being brought in and discarded, or flaked pieces retained, removed and discarded elsewhere.

Technology of the flaked pieces

The flaked pieces are non-prepared cores, some with fixed perimeter. For Level XIII only flint flaked pieces have been knapped with a fixed perimeter whilst in level XVII there are fixed perimeter non-PCT flaked pieces in all the raw materials. The level XIII show a wider range of knapping techniques with single scars and mixed techniques dominating. In level XV and even more so in XVII alternate knapping is more dominant, either as episodes of alternate knapping or in combination with parallel knapping. This is possibly a reflection of the apparent higher intensity of knapping present in the Level XVII assemblage (see tables above). However with the relatively low incidence of flaked pieces and the absence of the complete *chaîne opératoire* it is difficult to confidently recreate the knapping strategies of the Bolomor hominins.

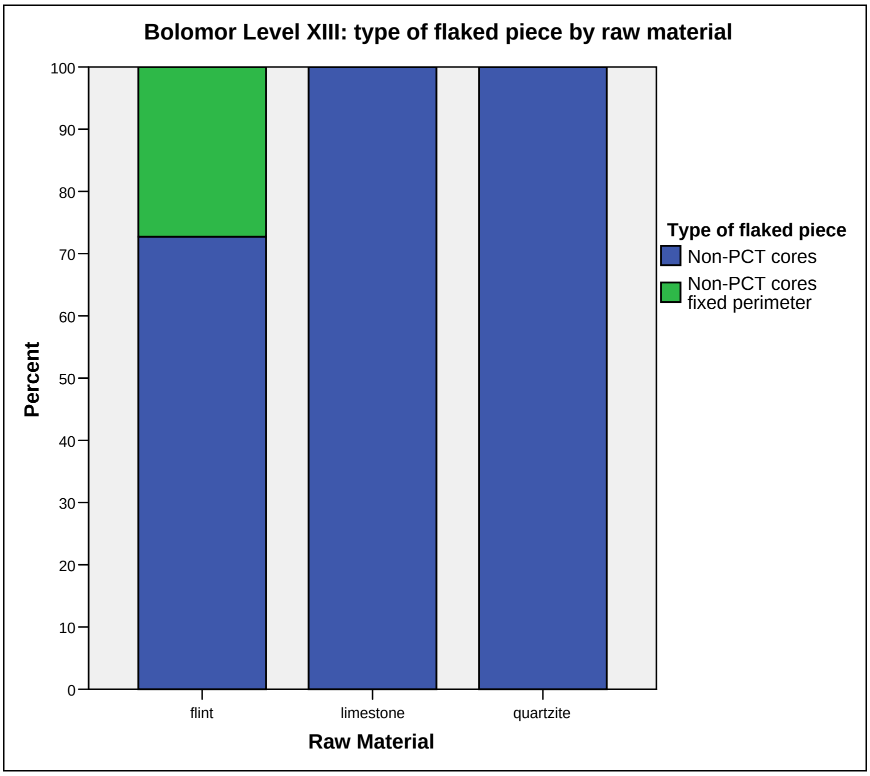

Figure 6.3 showing distribution of types of flaked pieces for Bolomor level XIII (N= 11 (F), 4 (L) and 2 (Q)).

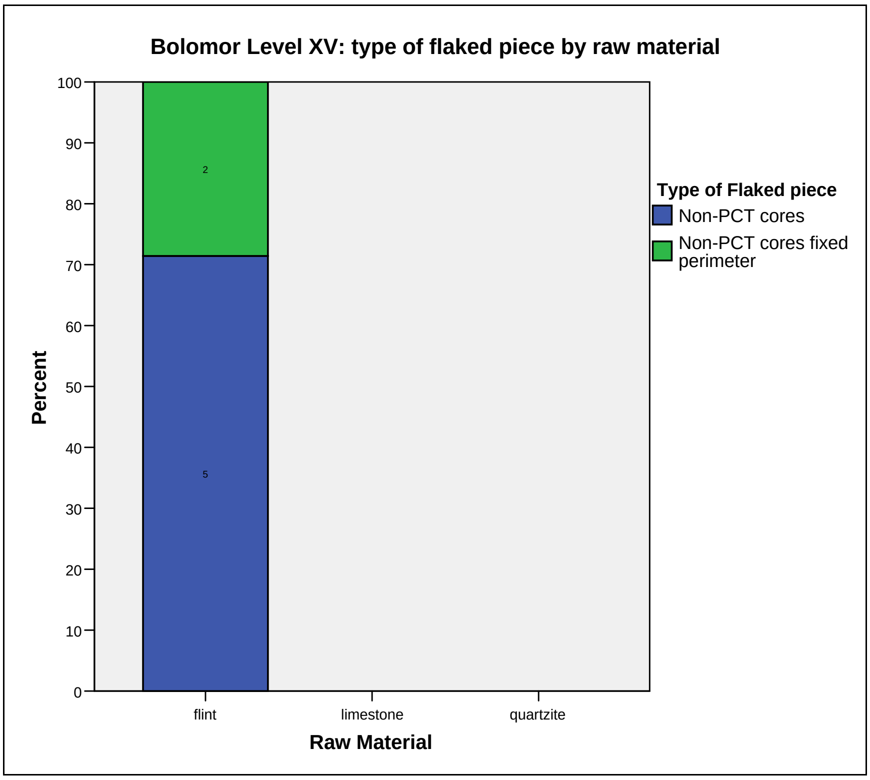

Figure 6.4: distribution of type of flaked piece for Bolomor Level XV (n=7).

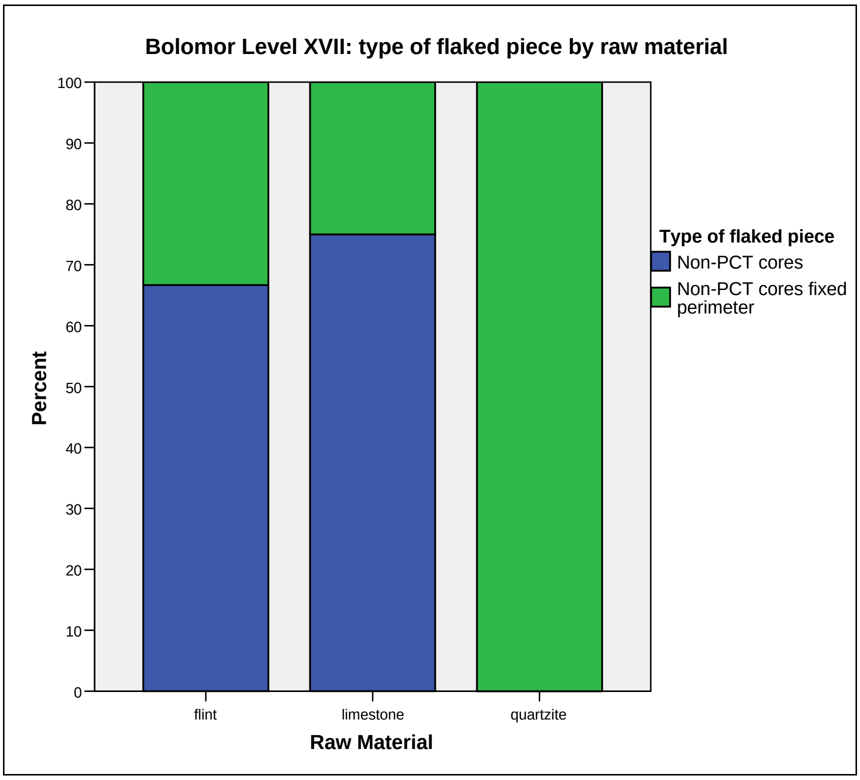

Figure 6.5: distribution of type of flaked pieces for Bolomor Level XVII (N= F3, L 4, Q2).

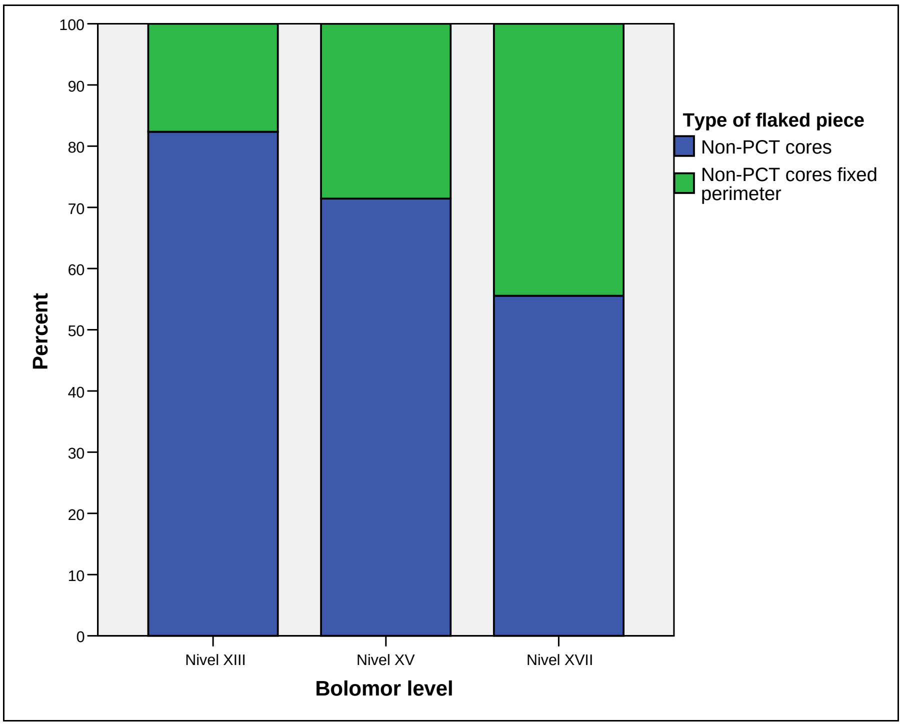

Figure 6.6: distribution of type of flaked pieces for Bolomor Level XIII, XV ad XVII.

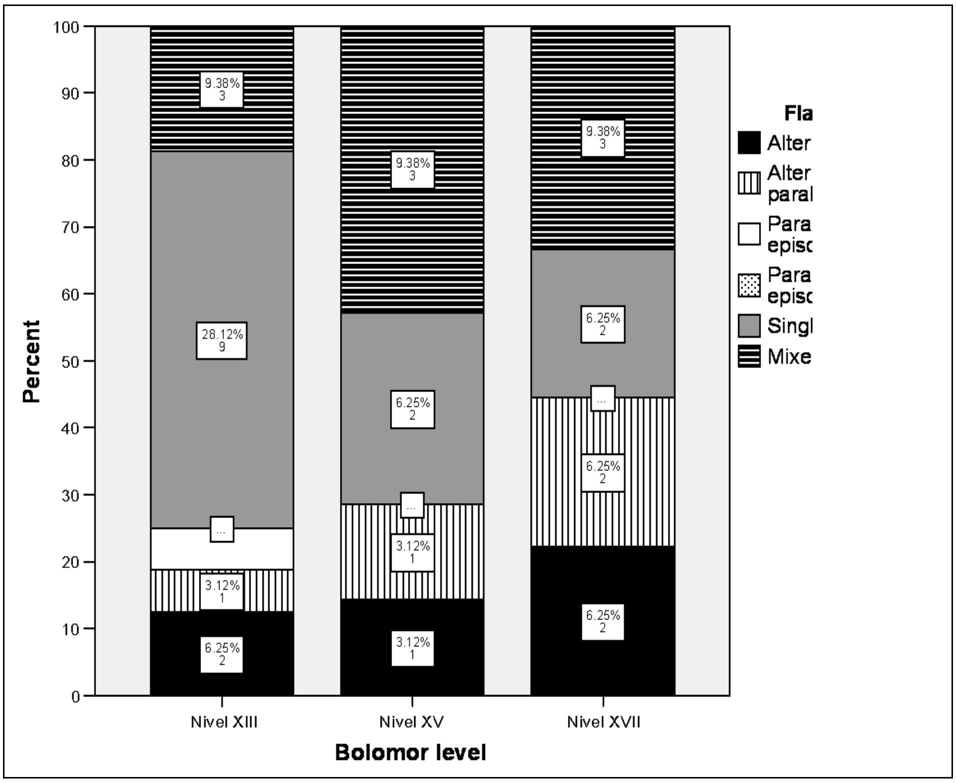

Table 6.7: types of flaking for flaked pieces for level XIII, XV and XVII.

Flakes

Flakes dominate the Bolomor assemblages and the site has been interpreted as a strongly flake-based industry with knapping strategies focused on producing small to medium flakes for use and retouch. However the disparity between the number of flakes and the number of flaked pieces is notable; as identified above this may, at least in part, be due to the bringing in of already knapped material and this is supported by distribution of flake Toth types.

For *in situ* knapping, as discussed in previous chapters, one might expect a distribution with a higher incidence of Toth type 5 flakes – those with some cortex on the dorsal surface. As is seen in the graphs below for the Bolomor assemblages there is a higher incidence of Toth type 6 flakes, those with no cortex (figure 6.8). This is the pattern one would expect if a large number of already flaked cores were being brought in, or if uncortical flakes selected from elsewhere were being brought in. For all the levels the only raw material to display the pattern of Toth type distribution that might be expected for *in situ* knapping is quartzite. This is particularly interesting as the ratio of flaked pieces to flakes for quartzite is particularly high (1: 33.5in level XVII, a complete absence of flaked pieces in Level XV and 1:50 in Level XVII). This be consistent with a scenario in which quartzite pebbles are brought into the cave to be knapped but where the resulting flaked pieces are taken away again. The number of flaked pieces in the flint for all levels is low compared to what might be expected to produce the number of flakes found suggesting that for flint also the flaked pieces were taken away. However, the dominance of non-cortical (Toth type 6) flakes in all the levels suggests that, unlike the quartzite, the flint was also being brought in already worked. The limestone is interesting in that the flake Toth type distribution is very similar to that for flint suggesting that for all levels discussed here the limestone was brought in already worked to some degree. However, the ratio of flaked pieces to flakes is much lower (1:12 for Level XIII and 1:12.5 for Level XVII) suggesting that the mobility of the resulting limestone flaked pieces is much less than that of the quartzite or flint, although the flaking strategy in terms of flake production is consistent.

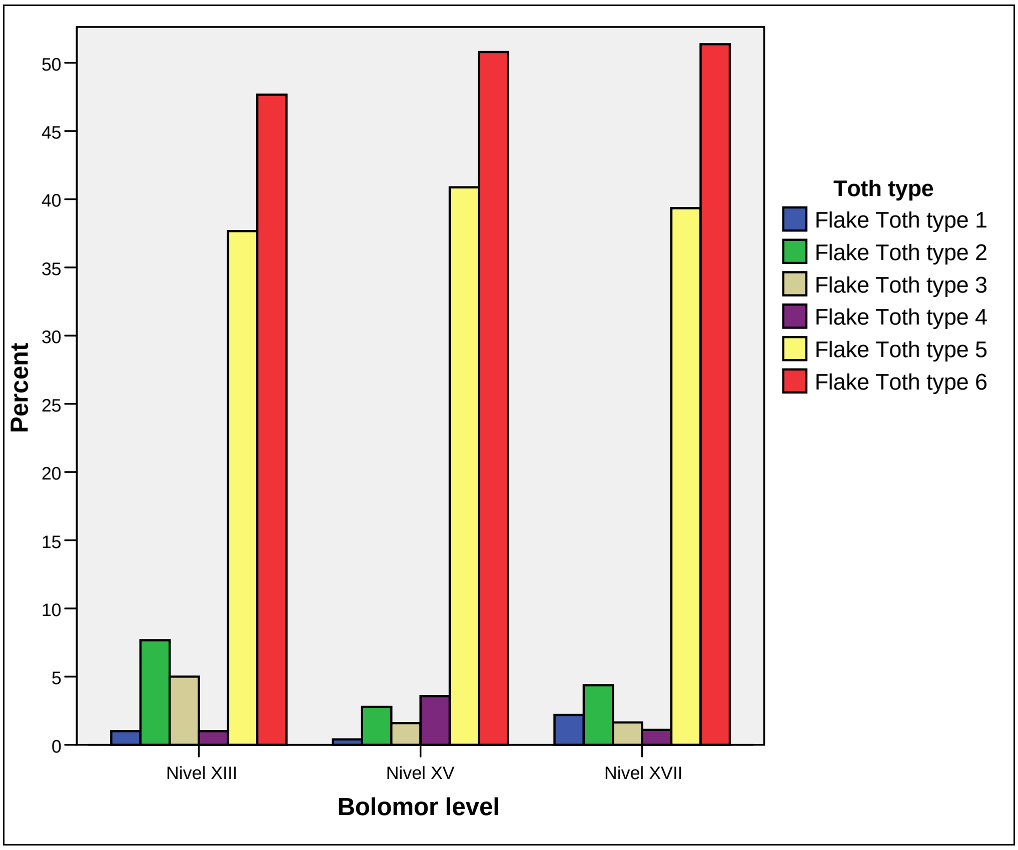

Figure 6.8: Flake Toth Types for Bolomor level XIII, XV and XVII

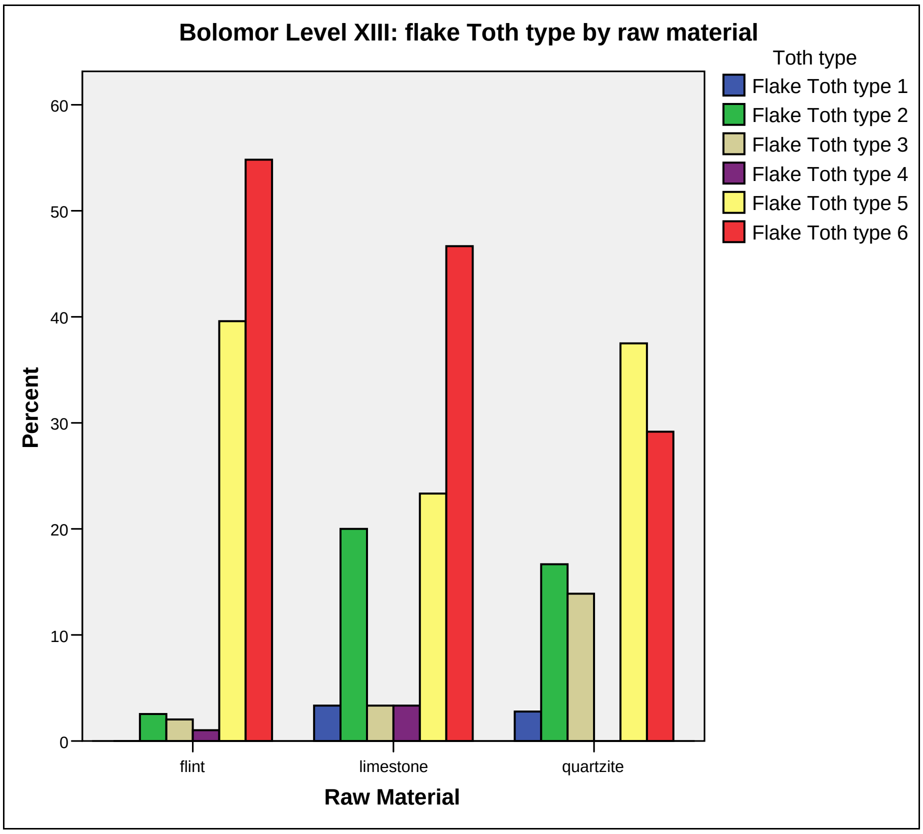

Figure 6.9: Flake Toth Types by raw material for Level XIII

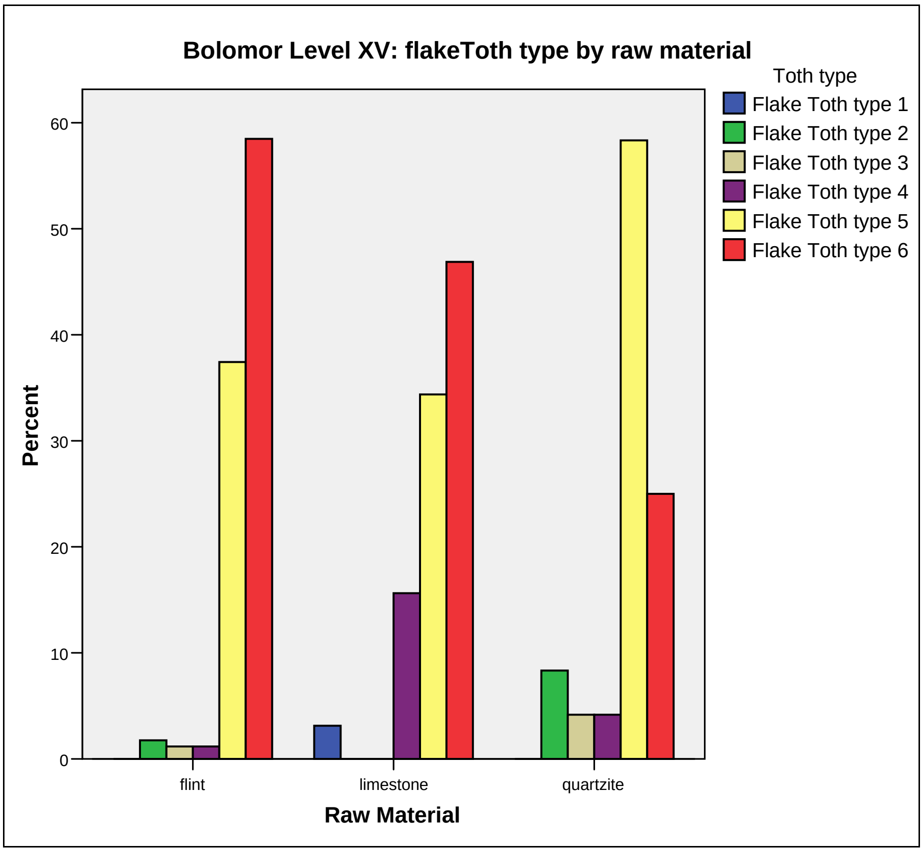

Figure 6.10: Flake Toth Types by raw material for Level XV

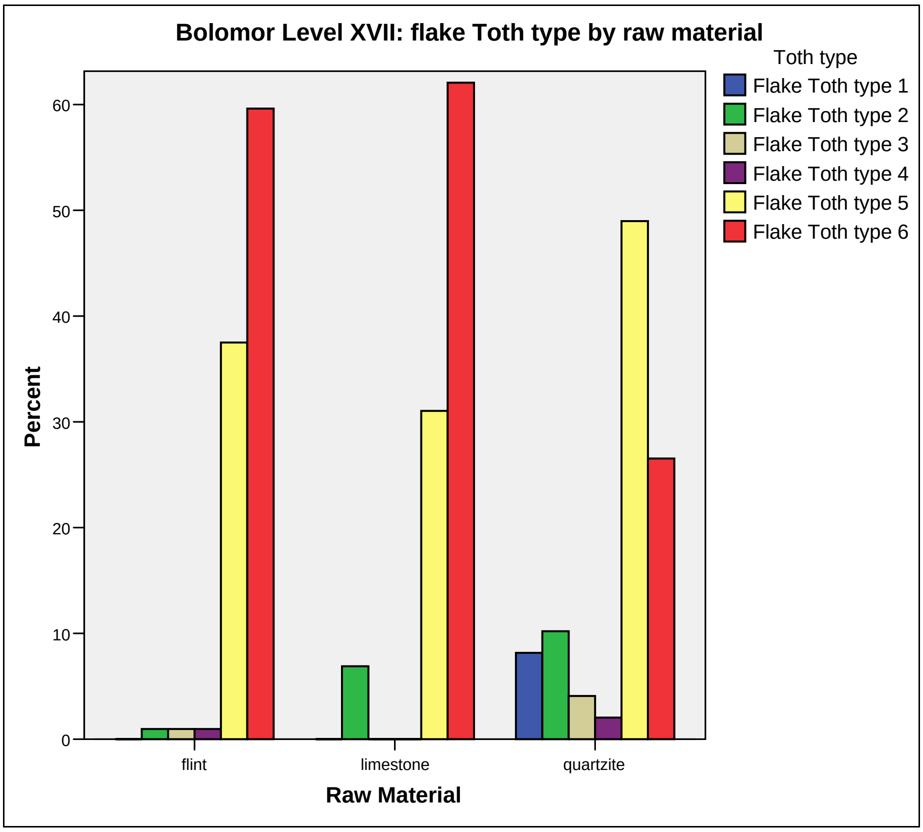

Figure 6.11: Flake Toth Types by raw material for Level XVII

Retouched tools

The retouched tools are simple and display little standardisation making the application of any more complex typologies, such as that of Francois Bordes, difficult. For purposes of comparison, the simple typological approach to retouched tools outlined in the methodology chapter has been applied, and I would like to emphasise that my experience of recording the assemblages led me to believe that a more complex typology would have been inappropriate.

In Level XVII the retouched tools are primarily on flint (58%), followed by quartzite (30.4%) and finally limestone (11.6%). While chunks and core fragments have been retouched, the predominant blank for a retouched tool for all raw materials is a flake from the latter stages of knapping (Toth type 5 or 6). These flakes are retouched into scrapers (44.6%), denticulates (16.2%), retouched notches (4.1%), convergent retouched pieces (4.1%), pieces with multiple retouch (9.5%), flaked flakes (9.5%) and non-diagnostic and utilised pieces (13.5%) (Table 6.9). The distribution of retouched types for flint and quartzite are similar, although there are a higher number of non-diagnostic pieces in quartzite, possibly relating to the coarser grain of the raw material.

The few retouched limestone pieces though show an equal quantity of denticulate retouched pieces and scrapers.

			Scraper	End scraper	Denticulate	Retouched notch	Point/ converegent	Non-diagnostic	Multiple	Flaked flake&spall	Utilised	TOTAL
Bolomor Level XIII	**Flint**	**N**	22	1	7	4	3	9	9	5	2	62
		%	35.5	1.6	11.3	6.5	4.8	14.5	14.5	8.1	3.2	
	Limestone	**N**	1	-	-	-	2	-	-	1	-	4
		%	25	-	-	-	50	-	-	25	-	
	Quartzite	**N**	5	2	4	1	-	6	4	1	8	31
		%	16.1	6.5	12.9	3.2	-	19.4	12.9	3.2	25.8	
	Subtotal	**N**	28	3	11	5	5	15	13	7	10	97
		%	28.9	3.1	11.3	5.2	5.2	15.5	13.4	7.2	10.3	
Bolomor Level XV	**Flint**	**N**	24	3	5	7	4	12	16	7	8	86
		%	27.9	3.5	5.8	8.1	4.7	14	18.6	8.1	9.3	
	Limestone	**N**	1	-	-	-	-	-	-	1	-	2
		%	50	-	-	-	-	-	-	50	-	
	Quartzite	**N**	3	2	1	-	1	3	-	2	2	14
		%	21.4	14.3	7.1	-	7.1	21.4	-	14.3	14.3	
	Subtotal	**N**	28	5	6	7	5	15	16	10	10	102
		%	27.5	4.9	5.9	6.9	4.9	14.7	15.7	9.8	9.8	
Bolomor Level XVII	**Flint**	**N**	20	1	5	2	1	1	5	5	5	45
		%	44.4	2.2	11.1	4.4	2.2	2.2	11.1	11.1	11.1	
	Limestone	**N**	2	1	3	1	1	-	-	-	-	8
		%	25	12.5	37.5	12.5	12.5	-	-	-	-	
	Quartzite	**N**	7	2	4	-	1	3	2	2	-	21
		%	33.3	9.5	19	-	4.8	14.3	9.5	9.5	-	
	Subtotal	**N**	29	4	12	3	3	4	7	7	5	74
		%	39.2	5.4	16.2	4.1	4.1	5.4	9.5	9.5	8.1	
TOTAL		**N**	**85**	**12**	**29**	**17**	**13**	**34**	**36**	**24**	**25**	**273**
		%	**31.1**	**4.4**	**10.6**	**6.2**	**4.8**	**12.5**	**13.2**	**8.8**	**9.2**	

Table 6.8: retouched tool types by raw material for Level XIII, XV and XVII, Bolomor Cave (my data)

In Level XV the retouched tools are again primarily on flint (83.5%) with a much smaller proportion on quartzite (14.3%) than seen in Level XVII and just 2 utilised flakes (2.2% of the utilised and retouched assemblage) in limestone. A single chunk and two core fragments have been retouched but the majority of blanks selected are flakes with little cortex (Toth type 5 and 6).

In Level XIII the majority of the retouched pieces are in flint (70.1%) with some retouched quartzite artefacts (27.3%) and just 2.6% limestone retouched pieces (Table 6.10). Only flakes have been retouched in this level, primarily flakes from the later stages of knapping (Toth type 5 and 6) in flint. However, for the quartzite retouched assemblage from this level the greatest percentage are those flakes from the earlier stages of knapping (Toth types 1, 2 and 3) with cortical butts and some cortex on the dorsal surface. There is also a single possible PCT flake. These flakes have been retouched into scrapers, both in flint and quartzite, although there are a large number of non-diagnostic and utilised pieces, particularly in quartzite. Denticulates are also present (11.3%) as are retouched notches (5.2%), convergent retouched pieces (5.2%) and flaked flakes (7.2%).

		Bolomor retouched tools																				
		Chunk		Core frag.		Flake Toth type 1		Flake Toth type 2		Flake Toth type 3		Flake Toth type 4		Flake Toth type 5		Flake Toth type 6		Broken hard hammer flake		PCT radial flake		Total	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
	flint	-	-	-	-	-	-	3	5.6	1	1.9	1	1.9	22	40.7	22	40.7	5	9.3	-	-	54	70.1
	l'stone	-	-	-	-	-	-	1	50	-	-	-	-	1	50	-	-	-	-	-	-	2	2.6
	q'zite	-	-	-	-	1	4.8	8	38.1	3	14.3	-	-	3	14.3	4	19	1	4.8	1	4.8	21	27.3
XIII	**S'total**	**-**	**-**	**-**	**-**	**1**	**1.3**	**12**	**15.6**	**4**	**5.2**	**1**	**1.3**	**26**	**33.8**	**26**	**33.8**	**6**	**7.8**	**1**	**1.3**	**77**	**100**
	flint	1	1.3	2	2.6	-	-	2	2.6	-	-	1	1.3	32	42.1	22	28.9	16	21.1	-	-	76	83.5
	l'stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	100	-	-	2	2.2
	q'zite	-	-	-	-	-	-	2	15.4	-	-	-	-	8	61.5	2	15.4	1	7.7	-	-	13	14.3
XV	**S'total**	**1**	**1.1**	**2**	**2.2**	**-**	**-**	**4**	**4.4**	**-**	**-**	**1**	**1.1**	**40**	**44**	**24**	**26.4**	**19**	**20.9**	**-**	**-**	**91**	**100**
	flint	2	5	2	5	-	-	1	2.5	-	-	-	-	20	50	13	32.5	2	5	-	-	40	58
	l'stone	1	12.5	-	-	-	-	-	-	-	-	-	-	2	25	4	50	1	12.5	-	-	8	11.6
	q'zite	1	4.8	1	4.8	-	-	3	14.3	-	-	-	-	13	61.9	2	9.5	1	4.8	-	-	21	30.4
XVII	**S'total**	**4**	**5.8**	**3**		**-**	**-**	**4**	**5.8**	**-**	**-**	**-**	**-**	**35**	**50.7**	**19**	**27.5**	**4**	**5.8**	**-**	**-**	**69**	**100**

Table 6.9: Blanks selected for retouch for Levels XIII, XV and XVII by raw material (my data). NB data not available for all retouched tools

Bolomor is a rock shelter occupation site with a series of archaeological horizons spanning a time period from c.350kya to c. 100kya. Handaxes are absent from all levels and although larger raw material is available the assemblage is dominated by small flakes with retouched tools (principally scrapers and denticulates). There is movement of raw materials, probably in various degrees of reduction, in and out of the cave and the *in situ* diachronic change difficult to link to cultural influences.

Atapuerca

It is impossible to discuss the Lower Palaeolithic of the Iberian peninsula without considering the site of Atapuerca in the northern part of the Spanish Meseta. For the past few decades research has been ongoing in the Sierra de Atapuerca, not far from Burgos, identifying and excavating a number of caves which have yielded particularly rich Pleistocene faunal, palaeoanthropological and archaeological assemblages dating from >780kya in Gran Dolina (TD6 and below) to c. 200kya for the uppermost levels in the Galeria. The excavators have described a sequence of lithic assemblages present on the site – although occasional finds are present in levels TD4 and TD5 (see gazetteer for details) it is not until TD6 when lithic artefacts are found in any number. Unfortunately the flint on the site has suffered from desilification which means that many of the artefacts do not survive sufficiently to be analysed; a particular problem as flint makes up the majority of the assemblage. However, an assemblage of over 250 artefacts has been found from TD6 in two types of flint, quartzite, sandstone, limestone and quartz. The assemblage is described by the excavators as 'Mode 1' and consists of pebble cores and tools, flakes, retouched flakes and flaked-flakes. Flakes make up the majority of the assemblage and retouched tools, mostly scrapers and denticulates, make up 9% of the total assemblage (Carbonell *et al.* 1999a, Carbonell *et al.* 2001). Handaxes are present in some of the upper levels of Gran Dolina (TD10A) and in the Galería sites. For the excavators there is a clear chronological sequence illustrated by presence of 'Mode 1' technology in the lower, oldest levels, 'Mode 2' characterised by bifaces from c. 500kya (particularly Galería) followed by 'Mode 3' with its prepared cores with hierarchical knapping faces in TD10.1 and Sima del Elefante at between 400 and 300kya.

The most interesting level for the purposes of this study is that of TD10, a rich archaeological level from the top of the Gran Dolina sequence which is sealed by deposits relating to the collapse of the cave, believed to date to MIS 9 (Mallol and Carbonell 2008). TD10, which now includes the level formally known as TD11 (See Mallol and Carbonell 2008), is subdivided into four archaeological levels. From base to top: TD10C, TD10B, TD10A, TD10.1. It is difficult to quantify the assemblage into the categories used for this study as the majority of publications use the 'systeme logique analytique' which does not distinguish easily between retouched tool types. This is a good example of typology influencing interpretation as discussed in Chapter 1 (see Text Box 6.1 for further consideration of this)

TD10C has no bifaces and the assemblage is dominated by flakes. The retouched tools consist of scrapers, denticulates and pieces with convergent retouch.
TD10B is again consists mostly of flakes, with scrapers dominating the retouched tools. Denticulates and convergent retouched pieces are also present.

TD10A is dominated by flakes and has a greater proportion of denticulates amongst the retouched tools than assemblage TD10C or TD10B. There are also two bifaces in this assemblage and a high number of scrapers and convergent retouched pieces. TD10.1 has particularly poor flint preservation resulting in a high number of indeterminate pieces, there is a noticeably higher proportion of flaked pieces than for the other levels, some of which could be described as discoidal. The TD10.1 cores also are reported to have a high incidence of hierarchical flaking surfaces and other characteristics associated with 'prepared' cores; a number of refits indicate that at least some of the material was flaked at the site. A single handaxe has been recovered from TD10.1. The industry from TD10.1 has been described as 'Mode 3'.

In addition to the lithic assemblages the faunal material throughout TD10 has high incidence of cutmarks and other anthropogenic damage marks. Common species are horse, deer and bovid and it would seem that the hominins were exploiting large mammals here.

Level GII of the Galería cave, another part of the Atapuerca cave system, having been dated to MIS9, is potentially contemporaneous with the TD10 levels although assemblages are reported as being quite different. If not contemporaneous then current interpretations might place the GII assemblage as slightly younger. Levels GII and GIII of the Galería contain handaxes and the occupation associated with these levels is considered to have been sporadic with minimal anthropic impact. In contrast the 'Mode 1' occupations of TD6 are reported by the excavators as the result of 'occupations structurales ou de longue durée' (Carbonell *et al.* 2001: 260). TD10 assemblages are believed to have accumulated during longer term or more intensive activity/occupation.

The assemblage size for which information is available for each of the sublevels for TD10 is small (less than 400) although it is understood that this assemblage size has been greatly increased by recent excavation. There are similarities between the TD10 assemblages in the high incidence of flakes as opposed to flaked pieces and in the knapping strategies which seem to have been focused on the production of small flakes, some of which are then retouched into simple scrapers, denticulates and convergent pieces. Handaxes do not appear to have been a significant element of the assemblages, although they are present in some of the sublevels. It is not clear from the reports on these assemblages whether or not any thinning flakes were present in these assemblages. The absence of large flakes may explain the paucity of bifaces, however it also makes the TD10 assemblage very different from the British Clactonian sites which have focused on the production of larger flakes.

The Atapuerca Effect

The significance and influence of Atapuerca has not been restricted to its archaeological and palaeontological discoveries but extends to the wider world of Palaeolithic research in the peninsula and beyond. The site has nurtured a whole generation of Palaeolithic researchers who, having cut their teeth in the Sierra de Atapuerca, have branched out to explore other sites in Spain, and further afield, taking with them an understanding of and approach to Palaeolithic archaeology learnt at Atapuerca. This includes the use of the *Logical Analytical System* of lithic analysis first developed, amongst others, by Eudald Carbonell (one of the directors of the Atapuerca excavations) in the 1980s and increasingly employed in the analysis of Lower and Middle Palaeolithic lithic assemblages across Spain, and certain areas of France (Bernal and Moncel 2004; Carbonell *et al.* 2005; Carbonell *et al.* 1999b; Peña 2008; Rodriguez 2004). Heavily influenced by the work of Laplace, D. L. Clarke and Thompson (see Rodriguez 2004 for a summary in English), this system of analysis was initially developed to provide a neutral framework for lithic analysis which would also take into account the *Chaîne Opératoire* approach to lithic production, use and discard by acknowledging the hierarchical nature of the processes of lithic manufacture and permitting artefacts to be placed within this hierarchy. For example simple flaked items are described as Negative Bases of First Generation (e.g. 1GNB), simple unretouched flakes are Positive Bases (PB) and retouched flakes fall within the category of Second Generation Negative Bases of Configuration (2GNBC). While the aims of the system - to move away from subjective typologies concentrating on final form rather than process - are admirable, in order for different commonly understood and recognisable types (such as handaxes, denticulates, Levallois) to be identified within this system the 'old fashioned' terms must be deferred to. That the attribution of these traditional and subjective labels seems unavoidable (there is not a single publication using the SLA system which does not resort to using these terms) would appear to highlight the fact that unfortunately certain key aspects of lithic analysis are always going to be subjective, thus undermining the good intentions behind the SLA.

The SLA approach to lithic analysis is usually employed in combination with the 'Mode 1', 'Mode 2' and 'Mode 3' terms for summarising the nature of the overall assemblage. Again these terms were developed to provide neutral terminology for the description of lithic technology. However, these broad brush labels can cloud the often subtle variations in the techno-typology of the assemblages.

A further key characteristic of the *Atapuerca School* of research is the processual progressive nature of the development and use of lithic technologies implied in the use of the 'Mode' terminology: that the assemblages' chronological order is intrinsically linked to their technological complexity. The lithic assemblages from the Atapuerca sites do seem to fit within a progressive sequence from simple core and flake 'Mode 1' technologies, through to bifacial 'Mode 2' technologies and then prepared cores of the 'Mode 3' technologies. And this model is applied elsewhere, used as a chronological proxy where absolute dating is unavailable, e.g. see recent work at Santa Ana Cave, Extremadura (Carbonell *et al.* 2005). Experience elsewhere in Europe, particularly in the UK where the oldest handaxes are in fact some of the finest made (e.g. Boxgrove) and some of the simplest technology is some 100kyr more recent (e.g. Clacton-on-Sea), should teach us to be wary of such an approach. It is true that the earliest archaeology in the Iberian peninsula is simple 'Mode1' core and flake technology (e.g. Orce), however we should not allow this to blind us to the possibility that such technological approaches may have reoccurred at several points throughout human evolution.

Text Box 6.1. Atapuerca influence

In summary Gran Dolina is a cave occupation site with a series of archaeological horizons spanning a time period from >780kya to c. 300kya. The early levels (e.g. TD4, 5 and 6) lack handaxes while the later TD10 levels (MIS9) are both with and without handaxes and there are penecontemporaneous levels in adjacent caves (e.g. Galeria) with handaxes. The later NBA archaeological levels are early Middle Palaeolithic assemblages with an emphasis on small to medium flake production with some core preparation. The retouched tools are principally scrapers with denticulates and convergent retouched pieces. There is no indication that raw material size restricted knapping options and there is evidence for the exploitation of large mammals.

El Aculadero and the Cadiz Littoral

The importance of the Cadiz Littoral for Palaeolithic remains has been known for some time but while there have been a number of surface collections made the only excavated site where handaxes are absent remains that of El Aculadero.

The site of El Aculadero is located to the west of the town of Puerto de Santa Maria in the north east corner of the bay of Cadiz in southern Spain. The site was discovered by M. Claude Vigier, a geologist at the University of Burdeos. In 1970 Vigier showed the lithic artefacts he had discovered to Francois Bordes, and in 1973 excavations at the site began under the direction of Claude Thibault, with assistance from M.ª Angeles Querol, and continued for 3 seasons. The results of these excavations were discussed and published through the Société Préhistorique Française and finally an analysis of the entire assemblage was published in 1983 (Querol and Santonja 1983) following the fifth 'Reunión del Grupo Español de Trabajo del Cuaternario' which was held in Seville in 1981.

The site is noted for its pebble tool assemblage which, it was observed, did not fit with other assemblages identified in Europe at the time. The nature of the assemblage led Bordes to suggest that it was of considerable antiquity, possibly from the earlier Lower Palaeolithic. However, the open air nature of the site and its location within beach deposits made dating the site difficult. Immediately below the artefact-bearing horizon is a paleosol formed during a period of warm climate; however, the gravel deposits containing the artefacts display features that result from cold conditions, such as ice wedges and cryoturbation, suggesting that the site was occupied either immediately preceding, or at the onset of, a glacial period. The excavators suggested (Querol and Santonja 1983) that this may correspond to the beginning of the Saletian period, believed to be the equivalent of the Gunz glaciation of the alpine glacial sequence (c. MIS 14). However, the correlation is not straightforward and the dating of this site remains extremely uncertain.Currently 'best-guess' scenarios estimate it as Middle Pleistocene; it could even be of early Upper Pleistocene date (Villa 1990).

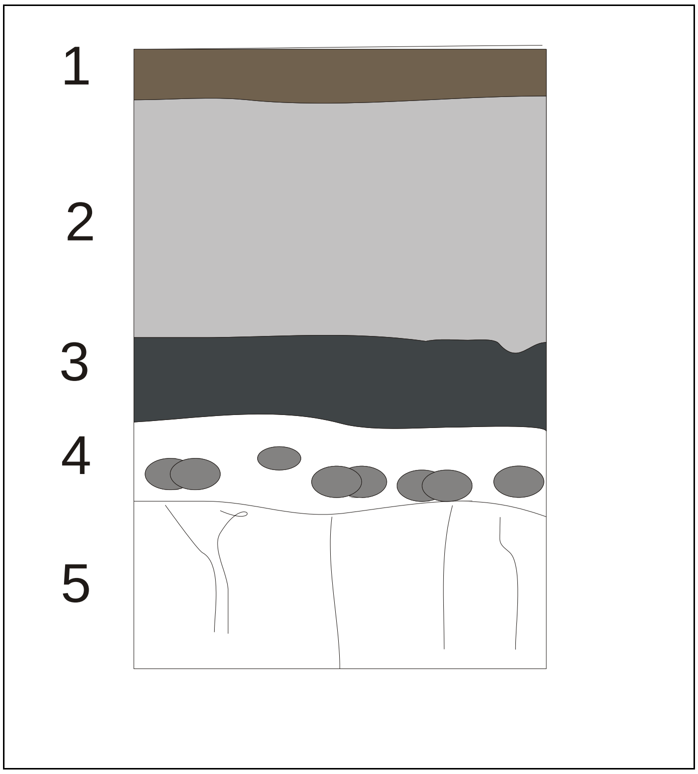

Figure 6.12. Schematic of stratigraphy at El Aculadero (after Querol and Santonja 1983). 1- redeposited sand; 2 – yellowish sand with almost continuous grey calcareous cement at the base; 3 – sand and gravel, slightly clayey and friable; 4 – small overburden and gravel with industry; 5 –yellowish sands with red soil in the upper levels.

The artefacts are found distributed throughout three sublevels, although the publication does not clarify whether these levels represent three separate periods of hominin activity at the site or are the result of site formation processes. The artefacts from the upper sublevel are usually resting on their longer side and are surrounded by gravel, in the middle sublevel the artefacts are more mixed up and associated with sand and gravel, in the basal sublevel the artefacts and pebbles are resting horizontally and are not associated with gravel. The excavators distinguished between these levels as a precaution but the majority of the artefacts come from the middle level. From the descriptions it would seem reasonable to surmise that the assemblage is not *in situ*.

The assemblage

It was not possible to study the material first hand as when I contacted the municipal Museum of Puerta del Santa Maria I was told it has been mixed with material from another Holocene site of the same name (Santonja pers. comm.). However, the information in the 1983 publication has provided useful data upon which the following discussion is based.

	Base Level		Middle Level		Upper Level		Total	
	N	%	N	%	N	%	N	%
Flaked pieces	155	43.8	652	32.0	67	29.8	874	33.4
Flakes	86	24.3	619	30.4	63	28.0	768	29.4
Retouched	77	21.8	448	22.0	57	25.3	582	22.2
Debris	36	10.2	318	15.6	38	16.9	392	15.0
Total	354		2037		225		2616	
Doubtful	42		122		20		184	

Table 6.10: Numbers of basic artefact types for El Aculadero (data from Querol & Santonja 1983).

		Flaked pieces		Flakes		Retouched		Debris		Total		doubtful	
		N	%	N	%	N	%	N	%	N	%	N	%
Upper level	**Quartzite**	65	97.0	55	87.3	50	87.7	34	89.5	204	90.7	19	95
	Quartz	1	1.5	1	1.6	3	5.3	1	2.6	6	2.7	1	5
	Schist	-	-	1	1.6	3	5.3	1	2.6	5	2.2	-	-
	Flint	-	-	5	7.9	1	1.7	2	5.3	8	3.6	-	-
	Limestone	1	1.5	1	1.6	-	-	-	-	2	0.9	-	-
	Total	67		63		57		38		225		20	
Middle level	**Quartzite**	598	91.4	561	90.6	392	87.5	292	91.8	1843	90.4	111	91.0
	Quartz	19	2.9	6	1.0	12	2.7	7	2.2	44	2.2	8	6.6
	Schist	19	2.9	14	2.3	23	5.1	3	0.9	59	2.9	2	1.6
	Flint	7	1.1	23	3.7	15	3.3	13	4.1	58	2.8	-	-
	Limestone	11	1.7	15	2.4	6	1.3	3	0.9	35	1.7	1	0.8
	Total	654		619		448		318		2039		122	
Base Level	**Quartzite**	140	90.3	80	93.0	71	92.2	34	94.4	325	91.8	38	90.5
	Quartz	8	5.2	1	1.2	2	2.6	-	-	11	3.1	2	4.8
	Schist	3	1.9	2	2.3	1	1.3	1	2.8	7	2	2	4.8
	Flint	-	-	1	1.2	3	3.9	1	2.8	5	1.4	-	-
	Limestone	4	2.6	2	2.3	-	-	-	-	6	1.7	-	-
	Total	155		86		77		36		354		42	

Table 6.11: Table showing distribution of artefact types by raw material. (data from Querol & Santonja 1983).

The assemblage is dominated by flaked pieces, many of which have been described as 'core tools' on the basis of the presence of a useable edge. There are also a small number of retouched artefacts on flaked pieces.

Quartzite pebbles are the principal raw material used, but other materials such as flint, schist and hard fine-grained limestone were also selected, all from readily available beach pebbles. The hominins were clearly targeting certain raw materials, for knapping rather than simply using what was to hand (see table 6.11).

	Unworked pebbles	**Industry**
Quartzite	71.6%	90.7%
Quartz	27.6%	2.6%
Flint	0.1%	2.5%
Schist	0.6%	2.7%
Limestone	0.1%	1.5%

Table 6.12: Raw material composition of unworked assemblage and worked assemblage. (data from Querol & Santonja 1983).

	Median	**Mode**	**Min**	**Max**
Flaked pieces	51.6	56-60	17	97
Flakes	27.4	26-30	12	71
Retouched	33.7	32-34	17	85

Table 6.13: Length of artefacts in mm from all levels. (data from Querol & Santonja 1983).

The artefacts are small. The retouched tools average 33mm in length and flakes at 27.4mm, suggesting, as might be expected, that larger flakes were selected for retouch. It seems likely that the artefact size is restricted by the size of the raw material, however from the size data available it does not appear that the flaked pieces were as intensively knapped as they might have been; average 51.6mm in length – still a knappable size and larger than the flaked pieces in both the Bolomor and Vertesszolos assemblages, both of which also used pebble raw material. This is probably due to the ready availability of beach pebbles in the immediate vicinity.

The retouched tools are interesting – Bordes himself noted that the assemblage did not fit comfortably into existing typologies and a simplified system was used. The most common type is 'non-diagnostic'. However of those retouched tools which are identified as recognisable types, scrapers dominate, although they are closely followed by retouched notches. There are a notable number of points, and denticulates appear to make up a lesser portion of the assemblage than many of the other Middle

Pleistocene assemblages looked at in this study. However, having not been able to view the assemblage first-hand, it may be that some of these retouched tools are in fact flakes with edge damage reflecting the depositional environment.

	Number	Percentage
Scrapers	38	8.2
End scrapers	7	1.5
Denticulate	20	4.3
Retouched notch (incl becs)	32	6.9
Point	22	4.7
Non diagnostic	311	66.7
Burin	1	0.2
Levallois	8	1.7
Pseudo levallois	3	0.6
Knives	17	3.6
Truncated blades	7	1.5
Total	466	

Table 6.14: Retouched tool types for all three levels (after Querol and Santonja 1983).

Those artefacts highlighted in grey in table 6.15 are those types which may indicate a more recent date for this site than has traditionally been claimed.

In summary El Aculadero is an open air beach site of uncertain date, although it is probably Middle or Upper Pleistocene. Its assemblage consists of simple pebble and flake tools and there are no handaxes or evidence of their manufacture although there are larger raw materials available.

Tagus Valley

One of the main rivers in the peninsula is the River Tagus which runs from its centre west into the Atlantic at Lisbon. In recent years a number of interesting sites have come to light from the terrace deposits of this river and its tributaries. Two assemblages in particular stand out for their conspicuous lack of handaxes: Ribiera da Atalaia and Fonte da Moita, both on the northern bank of the Tagus. An unpublished OSL date of c.300kya is presented in a display at the local museum for the terrace in which both Lower Palaeolithic assemblages are located (the date was made on samples taken from Ribeira da Atalaia). Recent reassessment suggests that there is in fact no secure evidence for hominin presence in Portugal prior to MIS9 (Oosterbeek *et al.*2010).

Unfortunately the sites have not been widely published and the information was gleaned in the course of a UISPP field trip to the sites. It is likely that further interesting finds will be recovered from this region in the future.

Figure 6.13: large pebble core from Ribeira da Atalaia. (NB absence of scale as photo taken from museum display, artefact is c. 250mm across) (Photo H. Fluck).

figure 6.14: artefact *in situ* in Q3 terrace gravel deposits at Ribeira da Atalaia (Photo H. Fluck).

Figure 6.15: Ribeira da Atalaia site (September 2005) (Photo H. Fluck).

There are a number of open air secondary/disturbed context sites associated with river terrace deposits of the Tagus and its tributaries. Dating is problematic, but thse sites are potentially MIS9. The assemblages consist of large flakes and cores on large, locally available pebbles. Handaxes are present in some locations but absent from others.

Conclusions

The variety of evidence makes the Iberian peninsula an extremely rich and interesting region for Palaeolithic research. The influence of its proximity to Africa on its Pleistocene human occupation is not fully understood – was there direct migration from Africa into Europe across the straits of Gibraltar as has been suggested by many researchers working in the peninsula (e.g. Kozlowski 2003)? And if so, was this a one-off, or were there repeated migrations across the straits? Both of these questions remain unanswered and thus the potential influence of such population movements on the lithic assemblages cannot be ruled out. In addition, while there is reasonable dating from most of the cave sites, it is difficult to correlate assemblages from less well-explored caves and rockshelters, and in particular from the open air localities such as assemblages from littoral and fluvial deposits; dating open air sequences remains a challenge.

Handaxes are widespread in the peninsula but there are certain areas where their absence is notable, such as the Mediterranean coastal area. However, this is usually a reflection of the paucity of Lower Palaeolithic assemblages overall. Broadly speaking, there appears to be a number of scenarios for NBAs.

1. The first is associated with the very early Lower Palaeolithic assemblages: Iberia contains some of the earliest archaeological sites in Europe and currently the majority of these sites consist of simple cores and flakes.

2. This scenario is associated with Middle Palaeolithic flake-tool-dominated assemblages where hand axes appear to be either extremely rare or absent. Many of these sites have been left out of this study due to the presence of Levallois type prepared core technologies (indicating a later date), however it is likely that Bolomor and the TD10 levels at Atapuerca Gran Dolina fall within this category despite the low incidence of prepared cores.

3. Perhaps most interestingly for this study is the third scenario emerging from recent work in the Tagus valley in Portugal. These sites do not appear to be particularly early, neither do they appear to indicate a flaking strategy dominated by the production of small to medium flakes as seen in some of the early Middle Palaeolithic type assemblages. Instead they are open air localities, often in disturbed or secondary context, associated with the Tagus and its tributaries, which are dominated by the working of large raw material to produce large flakes.

Comparisons with the Clactonian

On the whole the NBAs associated with the first and second scenarios above are quite different from the British Clactonian assemblages. As with the central European assemblages the difference in artefact size is quite notable. The NBA assemblages from this region are focussed on the production of small to medium flakes for the manufacture of flake tools. There may also be a pebble tool element (e.g. El Aculadero and quartzite at Cova del Bolomor), however these assemblages are not associated with the large flake production seen in the British Clactonian. The context of these assemblages is different too with cave sites and littoral deposits the main focus.

A significant exception to this pattern are the sites of Ribiera da Atalaia and Fonte da Moita from the Q3 terrace of the Tagus in Portugal. These assemblages appear to show a knapping sequence for the production of large flakes with few retouched tools. Unfortunately, it was not possible to investigate these assemblages in more detail but work in this region is ongoing and it is one area where possible future research may indeed recovered assemblages similar to the Clactonian seen in the Thames Valley. At this stage however the dating of these assemblages appears to be very different with an OSL date of c. 300kya, as compared to an MIS 11 date for the majority of the Clactonian assemblages.

Chapter Seven

Discussion and conclusion

The preceding chapters have presented the findings from each of the regions studied: Britain; France; Iberia; and, central Europe. In this chapter I return to the initial questions of the thesis:

- What does a broader investigation of Middle Pleistocene non-biface assemblages tell us about the Clactonian phenomenon in Britain?
- What is the Clactonian?
- How similar are other Middle Pleistocene non-biface assemblages to the Clactonian?
- To what extent does an absence of bifaces make these assemblages similar?
- If there are differences between the non-biface assemblages, what are they, and why is this?

What is the Clactonian?

From my analysis of the British non-biface assemblages presented in Chapter 3 there is a clear picture of the Clactonian as a chronologically and geographically discrete collection of assemblages.

The assemblages are concentrated in the early part (HoIIb-c) of the MIS11 interglacial. Even taking into account the possible exception of Little Thurrock (possible MIS10 or early MIS9), the Clactonian assemblages occur in the first half of the interglacials.

The Clactonian assemblages are all associated with the palaeo-Thames and its tributaries. The artefacts are most frequently recovered from temporally and spatially averaged water-lain deposits and at most of the localities there is evidence for production of non-biface assemblages on more than one occasion. This suggests that in the Thames valley in the early Hoxnian, groups of hominins were repeatedly producing non-biface assemblages.

Technologically these assemblages consist of simple, unprepared cores flaked through alternate knapping to produce medium to large hard hammer flakes. There were few retouched tools and there is little standardisation observed in the retouched assemblages. Flaked-flakes are the most common form of retouch, followed by simple scrapers. Bifaces and any by-products of their manufacture are absent.

Clactonian parallels

As discussed in Chapters 1 and 3, the Clactonian has been at the heart of British Lower Palaeolithic debate since the early 20th century and has variously been linked to other NBAs elsewhere in Europe (e.g. Le Havre littoral finds, Central Europe). However, the Clactonian debate has been an insular one, particularly in recent decades (see Chapter 1). Throughout this study I have sought to compare the Clactonian with non-biface asemblages from elsewhere in Europe.

In Chapter 4, I compared the Clactonian to NBAs from central and eastern Europe. This area had been mooted as a possible 'homeland' of non-biface making hominins in Europe. Most interestingly, many of the assemblages which are reported as being non-biface assemblages in fact contain evidence of bifacial technology (e.g. Schoningen, Bilzingsleben). Although they may not contain traditional handaxes, the presence of bifacially worked points, and in some instances bifaces on material other than stone, means that these cannot be defined as NBAs within the definition of this study. The assemblages that were genuine NBAs, such as Vértesszőlős, were quite different from the Clactonian in assemblage composition and a differential use of raw material.

Chapter 5 looked at French NBAs and again found little similarity with the Clactonian. Chronologically there were differences, e.g. the most similar assemblage, Les Tares, is more recent, and technologically the Colombanien did contain some evidence for handaxe manufacture. There are regions where handaxes are not common, such as the Garonne (Jaubert and Servelle 1996), but no regions and/or periods with a consistent pattern of hominin behaviour where NBAs were produced. Caune de l'Arago, like the Colombanian sites, presents intermittent NBAs associated with some occupations.

Chapter 6 looked at the Iberian peninsula. Again there are areas where handaxes are rare but no times/places where NBAs were consistently produced. The Tagus valley may be an exception, however work is ongoing and the assemblages are not currently large enough to demonstrate the existence of a Clactonian-like NBA phenomenon. The NBAs in this study were primarily from cave sites where they appear to be associated with short occupations (e.g. Bolomor and Atapuerca). There are some parallels between this and the southern French cave sites such as Arago.

Having looked at both the Clactonian assemblages and non-UK European Middle Pleistocene NBAs, I find myself unable to *explain* either the Clactonian assemblages as individual sites or as a more general phenomenon. I cannot offer a single explanation for the absence of bifaces in each instance, nor can I explain why this NBA technology was repeatedly produced in this particular place and time. While this may be a surprising conclusion I do not consider it a failing. Although I do not think there is a single *explanation* for the presence of Clactonian assemblages, I do believe that there is a pattern that can be discerned, described, and put into perspective as a result of this study.

The broader Europe-wide comparison between the non-biface assemblages has highlighted a number of unique features of the Clactonian sites and has demonstrated their coherence as a phenomenon. However, the possibility of specific cultural or phylogenetic conections between the Clactonian assemblages and other European Middle Pleistocene lithic traditions seems tenuous at best for chronological, geographical and technological reasons.

Chronologically the Clactonian is discrete, correlating with the early MIS 11 interglacial; although other NBAs may be of similar date (e.g. possibly Vértesszőlős, Menez Dregan), the dating of these is not without controversy.

Geographically the Clactonian is discrete, associated with the Thames Valley. The only other NBAs that appear to present a geographically discrete entity are the French Colombanien (see Chapter 5) and the central European microlithic sites (see Chapter 4). However, in the central European microlithic sites, within which I include Rusko, Tzrebnica, Schoningen and Bilzingsleben, but not Vértesszőlős, there is a persistent presence of bifacially worked points, which, although these are not classic bifaces, they are bifacial, in their technology therefore exempting these sites from the NBA debate. From the Colombanien sites the only NBA which has been excavated from clear context and has yielded an assemblage of sufficient size is Menez Dregan; to date the other sites have yet to yield large consistently NBA assemblages. However, Menez Dregan itself also differs from the Clactonian sites in that it has a number of horizons with NBAs spread over several marine isotope stages. There is also evidence of bifaces in layers that have been described as lacking handaxes.

Technologically the Clactonian has some similarities with other NBAs, however the raw material does influence this. Alternate flaking is dominant in almost all the NBAs studied, although this is not surprising. Alternate knapping is an effective way of removing flakes from stone and simultaneously maintaining a working edge – either for further knapping or for use. It is also the basis for biface manufacture. Flaked flakes, common in the Clactonian, were not observed to the same extent in any of the other assemblages, although they have been observed at Les Tares (Ashton 1996, and Chapter 5). Overall the Clactonian can be interpreted as a suite of assemblages where the flaking strategy is concerned with the production of large flakes, something it shares with the assemblages from the Tagus valley and Les Tares.

Despite isolated similarities, there are no European NBAs which are comparable to the Clactonian in chronological discreteness, date, geographical consistency *and* technological similarity. The Clactonian can be described as a phenomenon unique to the Thames Valley in the early MIS 11 interglacial.

Default flaking pattern: a basic hominin behaviour

The simplicity of the flaking strategies observed in these NBAs is a recurring theme and something which warrants further consideration. I propose that there is such a thing as a *Default Flaking Pattern* employed by hominins from earliest stone technology. This Default Flaking Pattern consists of simple cores and flakes, and flake tools, without standardisation, which are manufactured with the primary purpose of producing useable and useful edges and has formed the basis of hominin technology since the earliest stone artefacts. This Default Flaking Pattern has persisted throughout human history and can be seen in technologies associated with *Homo sapiens sapiens* (for example, recent knapping of quartzite pebbles by fishermen in Galicia (Cano Pan and Vazquez Varela 1996) and certain British Holocene assemblages dated to the Bronze Age (e.g. see Pitts 1978)). This is not a new observation, Warren pointed this out with reference to the Clactonian in his 1951 paper (Warren 1951). Rather than simply a first step on the evolutionary ladder that is superseded by increasingly elaborate technological solutions this DFP is a persistent thread through hominin tool use across the millennia. Such simple core and flake technologies are observed in Mesolithic, Neolithic, Bronze Age and Iron Age assemblages in Europe and are not considered to denote cultural variation, or even function. Surface scatters of lithic artefacts from southern England are frequently undiagnostic in that they consist of simple cores, flakes and flake tools without characteristic preparation or retouched types typical of any period. Such assemblages are often known to be Holocene and are usually assigned a generic Neolithic to Bronze Age date (e.g. data from the Hampshire Historic Environment Record). There are also examples of sites where the Default Flaking Pattern is observed for particular raw material types. For instance in a report on a Late Palaeolithic assemblages from Gruta Do Calderao, Portugal the non-flint portion of the assemblage does not contain any of the artefacts diagnostic of its Magdalenian date (Zilhão 1996). Interestingly the author considers this to represent an expedient technology for the non-flint raw material (*ibid*). Such simple core and flake technologies are not necessarily considered to denote cultural variation, or even function, rather, this is the simplest way to work stone and as such is a behaviour common to all hominin species, in a similar way that nest building is common to birds. As such it can be considered a *baseline* to which hominins repeatedly return to in certain circumstances, for example when time is short, or resources are rare. In some instances the DFP has been interpreted as a cultural pattern in its own right, for example in Italy where there are a number of 'pebble tool cultures' (see gazetteer for a summary). I am keen to distinguish between the identification of an instance of DFP *interpreted* as a culture and the identification of and instance of Default Flaking Pattern as an empirical description of an assemblage.

It is my proposition that these NBAs are to a certain extent the result of Default Flaking Patterns (DFP).

Patterns in the Non-Biface Assemblages

I will now explain how the default flaking pattern is expressed in each of the non-biface assemblages explored in this study, the local manifestation and why these may vary from the DFP.

From my research there are four broad patterns of non-biface assemblages which can be observed.

1. The earliest occupation of Europe

These assemblages were avoided for the purposes of this study, nevertheless as instances of NBAs it is important to briefly discuss them. This corresponds with White's scenario 1 for assemblages without bifaces (White 2000). These include sites such as Orce in southern Spain where a number of simple core and flake tools have been identified in deposits dating to over 1mya (Gibert *et al.* 2006), and Dmanisi in Georgia where artefacts have been found associated with hominin remains c. 1.5mya (Gabunia and Vekua 1995; Gabunia *et al.* 2001). Sima del Elefante has also yielded early dates for artefacts (Parés *et al.* 2006). All the NBA sites in Europe currently fall within the range of time in which handaxes were being made elsewhere, and there are increasingly early dates for handaxes in Europe (e.g. Scott and Gibert 2009). These early NBAs can be considered as expressions of the default flaking pattern. The lower levels of Atapuerca Gran Dolina (TD6 and below) and Arago may fall into this category. There appears to be a correlation between Default Flaking Patterns sites and pioneer phases of occupation/reoccupation such as the Clactonian after the Anglian glaciation (White 2000) and short episodes of occupation such as the assemblages seen at Arago and Gran Dolina, Atapuerca. Such a correlation between short lived and/or pioneer occupation would be consistent with these early instances. Current indications are that occupation of Europe was sparse prior to 500kya, the high incidence of Default Flaking Pattern assemblages and a general paucity of handaxes in this early stage of Human occupation of Europe would appear to be consistent with the DFP interpretation as corresponding to short occupation.

2. Examples of Middle Pleistocene Default Flaking Pattern

The second category are incidence of DFP observable throughout the Middle Pleistocene. That is assemblages which display simple unprepared flaking technology, a few retouched tools and a lack of bifaces. Essentially the technology at these sites is concerned with producing useable edges rather than standard finished forms for artefacts or particular flaking strategies. From the assemblages studied here a number fall into this category although there are some important differences.

The Clactonian

The Clactonian is one such example of the Default Flaking Pattern applied to fluvial gravels. On the whole these assemblages are low resolution, secondary context (although the Lower Loam knapping floor and possible *in situ* knapping at Clacton are exceptions) and represent a repeated Default Flaking Pattern throughout a landscape which has subsequently been spatially and temporally averaged by subsequent geological processes. The Clactonian assemblages are consistent examples of DFP repeatedly produced in the early part of the MIS11 interglacial in the Lower Thames valley. The technology is simple and produced basic flakes from large flint nodules. Retouch is sparse and there is little indication of standardisation. Why these assemblages were produced is a question that has become entwined with the identification of the Clactonian assemblages as an empirical pattern, as explored in Chapter 1. However, what is demonstrated by this study is that the Clactonian assemblages do present a consistent pattern of DFP in the early MIS11 interglacial in the Thames valley. The correlation with the early interglacial may be consistent with the pattern observed in the first category (earliest occupation) where DFP assemblages are associated with pioneer phases of occupation, although increasing evidence for contemporary Acheulean assemblages (Preece and Penkman 2005; Preece *et al.* 2007) in Britain is challenging this , as is discussed further below.

Vértesszőlős

Vértesszőlős is an example of the Default Flaking Pattern applied to very small fluvial gravels, although there is also some indication that a larger raw material source has been exploited in a similar way albeit much more intensively. At Vértesszőlős the activity appears to be very localised, with no other contemporary sites for several hundred kilometres, but is repeated on a number of occasions over time at the same place. The size of the artefacts and the raw material they are manufactured on has clearly influenced this assemblage and makes it initially appear very different from the Clactonian. Likewise the differential use of more than one raw material is unlike the British NBAs, although this is possibly beause in the Thames Valley flint is the only raw material available. Chronologically the site may overlap with the Clactonian assemblages, but the dating range is extremely broad (MIS13 to MIS9). Although it is often grouped with other Lower Palaeolithic 'microlithic' assemblages such as Schöningen and Bilzingsleben, it lacks the bifacially worked tools seen at these sites, and unlike the German and Polish sites discussed in Chapter 4 there are few artefacts which would be suitable for hafting. Unfortunately, the excavation archive of Vértesszőlős is difficult to reinterpret but the assemblage does appear to be the cumulative result of repeated visits to the locality by hominins who discarded exhausted artefacts there. It seems reasonable to suppose that this site is a point in a hominin landscape which allows us a glimpse of hominin behaviour at one particular location where DFP was employed. Unfortunately, unlike the Clactonian assemblages, we do not have information about the activity in the wider landscape that enables us to determine whether this was unique to this particular locality or whether it reflects wider hominin behaviour in this area at this time.

The cave sites perhaps provide an interesting insight into high resolution instances of NBAs which are consistent with DFP.

Caune de l'Arago

Those levels in Caune de l'Arago where NBAs are recorded are levels which have been interpreted as short lived occupations. The same is true for the NBA levels at Atapuerca. There is a danger of a certain circularity to this argument: that the NBAs are what led the excavators to interpret the horizons as short-lived occupations. However, the spatial patterning and faunal assemblages are also different from those horizons with bifaces. The NBA assemblages are genuinely smaller. What I think is happening at these cave sites is a higher resolution glimpse into incidence of Default Flaking Pattern assemblages which occur during short occupations. What is curious about the Clactonian assemblages is that we have a time-averaged incidence of these Default Flaking Pattern assemblages, a low resolution over a longer time slot; unfortunately with the Clactonian it is not possible to determine just how long that time would be.

Bolomor

Bolomor does fit within this group in that the occupations appear to be short-lived. However it is unusual amongst the cave sites in that bifaces are entirely absent from all levels. Spatial analysis shows data consistent with repeated short occupations at the site – the hearths, where they have been identified, are usually single episode fires and lack debris that might be expected from fires associated with longer occupation such as chips from knapping. This pattern continues beyond the period of this study into the Upper Pleistocene.

At Arago, Bolomor and Atapuerca while there are horizons where relatively short lived occupations have left simple assemblages of flakes and unstandardised flake tools, for these sites the excavators have also observed a linear evolution of assemblages *in situ* which is influenced by a flake tool based technology. This is discussed further below (in 4).

3. NBAs with bifacial technology

The third pattern appears to be concentrated in central and north-central Europe and include the assemblages from Schöningen, Bilzingsleben, Rusko and Tzrebenica. These assemblages lack handaxes in the traditional sense, but unlike the Default Flaking Pattern sites the knapping is about more than just producing useable edges. These assemblages consistently include bifacially-worked pieces and worked convergent points, For this reason they are not Non-Biface Assemblages in the true sense (see illustrations in Chapter 4). These assemblages are also often referred to as part of a Lower Palaeolithic microlithic tradition as the artefacts are small – typically less than 5cm, often smaller. The extremely small size makes it difficult to see how these artefacts could have been used without hafting. The fact that many of the artefacts are not only very small but are also thin would seem to be consistent with a hafted technology. The presence of wooden artefacts at Schöningen, including a 'cleft' stick which has been interpreted as a possible haft would again add credence to this possibility. In any event, although these sites appear to relate to a distinct technological solution, one which uses small, thin, bifacially-worked tools in contrast to the larger tools typical of the Clactonian and Acheulean sites elsewhere, they are neither NBAs nor examples of default flaking pattern. These assemblages appear on current dating to become particularly prominent post MIS11.

4. Early Middle Palaeolithic assemblages

The fourth pattern observed is those sites which date to MIS 9 onwards and display consistency with early Middle Palaeolithic assemblages. These include a number of sites often referred to as Meridional or Southern Acheulean. Bolomor Cave, Arago and certain Gran Dolina localities and layers, could be included in this category.

Atapuerca Gran Dolina TD10 contains rare bifaces in its upper level (they are absent form the other two levels), however the assemblage is dominated by flake tools. The excavators consider this level to contain rudimentary core preparation, and discoidal flaking is also present. Although analysis of this level has been hampered by poor flint preservation it sits comfortably as an early Middle Palaeolithic flake–tool dominated assemblage.

Bolomor is slightly trickier to place as it is somewhat isolated in the Valencia area. Nevertheless, although there is little evidence of core preparation in the lower levels, the assemblage is dominated by flake tools with a clear similarity and '*in situ*' evolution of the assemblage through to MIS5e (Fernández Peris 2007). For this reason the site can also be considered as an early Middle Palaeolithic assemblage.

Arago again has a long archaeological sequence with repeated occupation from Early Middle Pleistocene through to Upper Pleistocene. The sequence is complex but for the excavators there is a clear indication of *in situ* development of the assemblage, from simple flake tools to the introduction of prepared cores. In this context the flake tool NBAs could be grouped within this early Middle Palaeolithic assemblage category, particularly this in Ensemble III and IV levels (see Chapter 5).

It is possible that such assemblages have a close link to the Default Flaking Pattern as discussed above, possibly emerging from situations where such technology was more frequent rather than more elaborated technologies involving regular handaxe manufacture. Given the correlation between the NBA levels at Atapuerca and Arago and short occupation increased mobility may have contributed to this.

Putting it into perspective: What the Clactonian is not

In comparing the Clactonian assemblages to other NBAs in Europe it is possible to begin to describe the Clactonian as a phenomenon. Although I do not think there is a single explanation, I do think we can make some assessment as to what the Clactonian is not.

Firstly, the Clactonian is not a culture in an anthropological sense. It could be considered an archaeological culture as defined by Clarke (albeit continuing a definition initially provided by Childe decades earlier) ‘a constantly recurrent group of contemporary artefacts within a limited geographical area’ (Clarke 1979: 490). Although it is identifiable as a discrete phenomenon, chronologically and geographically the timescales over which these similarities are recognised are great. The resolution simply does not allow us to discuss anthropological scale cultural variability. While the number of artefacts might be considerable, when one considers that 10,000 artefacts over a period of 1,000 years could result from just ten artefacts a year the idea of a ‘culture’ suddenly seems more tenuous. Potentially the time periods over which the Clactonian assemblages accumulated are much longer than this. Culture in an anthropological sense concerns behavioural similarities and consistencies in a human timeframe. This might be over a number of generations, centuries, and, in rare instances, over a thousand years or more (e.g. religions). However the geological timeframes within which the Clactonian must be discussed are beyond anything observable in ethological or anthropological terms. The evidence also demonstrates that the Clactonian does not result from continuous activity at the localities where it is found (see chapter 3). At each of the Clactonian localities there is evidence for at least two episodes of activity that produced NBAs. Although difficult to be precise, we cannot rule out that the length of time between these phases of activity certainly cover a number of generations. With such gaps in the record it is difficult to argue for a cultural correlation or continuity between these instances of activity.

Secondly, it is not the result of cultural migration. The suggestion that the Clactonian has its roots in areas of Europe, such as central and north central Europe, where handaxes are few and far between is questionable. These assemblages are not similar to the Clactonian assemblages: although they do not contain classic bifaces, they do contain a notable bifacial element with small bifacially-worked pieces and handaxes on bone. To try to connect these assemblages to the Clactonian on the basis of an absence of bifaces is misleading and also distracts from the fact that these assemblages present an interesting phenomenon in their own right (see Chapter 4), with striking similarities between assemblages from Bilzingsleben, Rusko and Tzrebenica *inter alia*.

Thirdly, it is not simply a product of raw material availability. The Clactonian assemblages, along with many of the NBA assemblages, come from sites where, although not necessarily ideal, the raw material would have been sufficient to produce handaxes. There are a number of sizeable cores from the Clactonian and given the size of flakes produced there is no reason why, if they wanted to, hominins could not have made handaxes. Equally the Colombanien sites have large pebbles which could have been worked into handaxes, Vertesszolos has radiolarite locally available which was used and could have been worked into larger tools as well as limestone, Cova del Bolomor also has larger raw material (principally limestone) available. The assemblages of the central and north-central European sites such as Bilzingsleben, Rusko and Tzrebenica are also reported to be manufactured on material that would not necessitate their small size, or an absence of bifaces, (Burdukiewicz pers. comm.), and the presence of bifaces on bone would suggest that when needed other materials could be used.

Fourthly, it is not the result of pioneer population in the sense of White (White 2000; White and Schreve 2000); however this is discussed in more detail below.

Finally, it is not an artifice of the record. The Clactonian assemblage is not the result of preservation, taphonomy or collection. Handaxes often dominate collected assemblages as they are easy to recognise, for collections to be made from which such artefacts are absent would suggest that this absence is genuine. Likewise the excavated assemblages do not contain elements of handaxe manufacture. The large areas that have been investigated preclude any suggestion that we have not found the handaxes yet. They may be elsewhere in the contemporary landscape as illustrated by Barnham St. Gregory, but the Clactonian assemblages represent points in the landscape where there are none, and have not been any for a considerable period of time.

The broader European perspective was essential for this understanding. Only through comparing the Clactonian with other NBAs outside the UK was it possible to truly establish the unique character of the Clactonian which is discussed in more detailed in the following section.

Putting it into perspective: What the Clactonian is.

The Clactonian assemblages present a regionally consistent pattern. The assemblages are consistent in terms of chronology and geography, concentrated in the Lower

Thames valley in the early MIS 11 interglacial (HoIIb-c). As such it can be said to present a consistent behavioural pattern of material culture.

There are consistent differences between the Clactonian assemblages and the others studied which strengthen its position as a separate phenomenon. The knapping strategies of the Clactonian assemblages are focused on the production of large flakes. The flake tools are simple and there is a high number of flaked-flakes. There is little standardisation of form – it appears to be more about the edges than the form of the artefacts, consistent with the idea of a *default flaking pattern*. The Central European NBA assemblages do have bifacial elements that simply are not seen in the Clactonian, and also contain small, thin flake tools, convergent retouched pieces and bifacially-worked pieces that are not present in the British NBA. Vertésszőlős is the exception to this. However, as I noted above, at Vertésszőlős there are important differences, these include a greater number of denticulates and few flaked flakes in the retouched tools, and the differential use of raw material is something not seen in the Clactonian. The Colombanien of Britainny (Chapter 5) also includes a range of raw materials not seen in the Clactonian with a heavy 'pebble tool' element and a lighter flake tool facies on flint and other finer grained material. However, given that flint is the only material available in the Thames Valley such variability may not be a fair comparison. Still, both the Colombanien sites and Vertésszőlős display a greater variability in assemblage composition than the Clactonian.

Interestingly, recent multidisciplinary analysis or microfauna, malacofauna, pollen and dating have highlighted the potential for Acheulean assemblages in Britain (broadly) contemporaneous with the Clactonian. Reanalysis of depositional sequences at the sites of East Farm, Barnham and Beeches Pit, West Stow, both in Suffolk, have played a key part in this. It appears that the Acheulean assemblages from the lower archaeological horizons at both these sites (Bed 3b at Beeches Pit and Level 5c at Barnham) are within deposits which are also assigned to the early MIS 11HoIIb-c and can be correlated through microfaunal, malacofaunal, pollen, macrofauna and geological analysis with the Lower Loam at Swanscombe (Barnfield Pit) and in turn with Clacton (Preece *et al.* 2007; Preece and Penkman 2005). Although contemporaneity is implied in broad climatological terms it does raise some interesting points about the context of the Clactonian closer to home. The possibility that the Clactonian, as an example of a default flaking pattern, is associated with 'pioneer' occupations appears to be challenged by the presence of other, handaxe-rich assemblages at the same time elsewhere in southern Britain. If we compare Acheulean sites and the Clactonian ones from the early Hoxnian there are a number of 'facts' that emerge.

1) That there are Clactonian assemblages in the Thames Valley contemporary with Acheulean assemblages further north in East Anglia and potentially in the Middle Thames valley.
2) That there are potentially MIS12 Acheulean assemblages in the Middle Thames Valley (Gibbard 1995; Wymer 1956, 1961, 1999; Bridgland 1994)
3) That the Clactonian assemblages are associated with fluvial contexts while the contemporary Acheulean ones are associated with still/slow moving water and marshy areas as well as rivers.
4) That in the MIS 11 interglacial the Acheulean assemblages appear earlier north of the Thames than they do in the Thames.
5) And that the Clactonian, at least at Swanscombe (Lower Gravels) and Clacton-on-Sea, potentially still predates the early MIS 11 Acheulean, although possibly not the early Acheulean to the west.

These observations have implications for some traditional interpretations of the Clactonian. Firstly, the idea that the Clactonian is the result of a cultural migration of hominins moving via a northern route back into Britain after the Anglian glaciation. I have already asserted (above) there is not evidence for this in the assemblages of central and north-central Europe, however the British data also contradict this. The earliest MIS 11 sites north of the Thames are currently all Acheulean sites (e.g. Barnham, Beeches Pit). Not only that but these sites are potentially contemporary with the Thames Clactonian sites. Were the Clactonian sites to have resulted from a pioneer population coming in from the north with a non-handaxe tradition one might expect the early Hoxnian sites of Suffolk to be Clactonian; this is not the case. Similarly evidence for handaxes from the Caversham ancient channel in MIS12 (Wymer 1956, 1961; Bridgland 1994) and from the Silchester Stage Gravels (Bridgland 1994 and Wymer 1999) adds a further challenge to such a view.

I suggest that there is not a single explanation but that an understanding of the 'bigger picture' of hominins in the landscape is crucial to making sense of this assemblage variability. I find the concept of a default flaking pattern a useful one and by taking a pan-European view of non-biface assemblages I have found that there are certain times and places when, for whatever reason, hominins have chosen to resort to a basic flake and core tool kit. Where high resolution data are available, these instances do appear to be associated with short-lived, expedient activity. The British Clactonian assemblages are for the most part low resolution, but nevertheless display the default flaking pattern potentially indicating repeated short-lived, expedient hominin occupation of this part of the Lower Thames in the early MIS11 interglacial

One emerging pattern is suggested by the local environmental context of the Clactonian sites (namely those at Clacton and Swanscombe) in comparison with that of contemporary Acheulean assemblages. The sites at Clacton and Swanscombe are associated with a large river system – the channels of the palaeo-Thames. When we look at the context of some of the penecontemporaneous Acheulean assemblages such as Barnham (Ashton *et al.* 2005) and Foxhall Road, Ipswich (White and Plunkett 2004), the pattern is more varied with an association with still and stagnant/boggy environments, slower-flowing smaller channels and pools. For instance Beeches pit has evidence of *in* situ handaxe manufacture potentially contemporaneous with Swanscombe and Clacton (Preece *et al.* 2007) associated with still-water deposits, or in the initial stage of a small channel. At Foxhall Road, although the dating is less certain, the handaxes are present in *in* situ clusters at the edge of a basin, or channel linking a series of pools.

Barham is a good example of how resource access could play a part in these differences (Ashton 1998). Here Nick Ashton has argued that the association of the ‘Clactonian’-type element of the assemblage, with an easy access raw material source in the form of flint river cobbles, contrasts with the appearance of handaxes when this ‘easy access’ resource is no longer exposed. He suggests that the handaxes may be present as an adaptation to scarcer resources. Instead of an expedient ‘default flaking pattern’ when material is easily to hand, we see a shift to more durable handaxe technology when it is not. It may be that river channels, particularly large rivers such as the Thames, would have sufficient exposures of raw material that a default flaking pattern sufficed. When these deposits became less reliable, as seen in slower-flowing water, more portable, curatable handaxes were used.

Of course it may be that fluvial environments are foci for different sorts of activity. Places to move through rapidly, for short-lived occupations where raw material may be exposed, while still/slower watery areas were places for longer occupations. This would be consistent with the very rare occurances of Acheulean bifaces in Clactonian assemblages. Any analysis of contemporaneity in this time frame must obviously be treated with caution, however; within this hypothesis it is possible to consider that the authors of the Clactonian and Acheulian assemblages might be one and the same.

In not accepting a single explanation for the Clactonian, my suggested explanations bring us full circle, back to defining, redefining, and comparing the Clactonian assemblages at a local level, within the British Pleistocene.

The influence of local research traditions

The strength of local research traditions cannot be underestimated. The historical baggage of the Clactonian has led to a polarisation of views – a sort of is it/isn't it debate rather than open discussion as to the patterns which are observable. White is correct in his warning that we should not be too hasty in trying to explain away this variation. The historical baggage can affect not only peoples interpretations but also what they choose to see or not see. For instance, the absence of handaxes in the Colombanien when in face they are present (see Chapter 5), the absence of bifaces in the central European assemblages when in face they are present, albeit in a slightly different form (see Chapter 4), and the presence of very occasional handaxes in the Clactonian assemblages. The need to assign categories that present a culture-historical view of the Palaeolithic is strong.

A uniquely British phenomenon

The Clactonian is an archaeological phenomenon that for a variety of reasons could only have occurred in Southern England. The absence of rich cave sites and the dominance of fluvial Pleistocene archaeology has meant that research has had to tackle the difficulties presented by secondary context archaeology. As such the understanding of dating and climate, particularly of the Pleistocene of the Lower Thames, has enabled a multidisciplinary framework that has not always been present in other regions of Europe. In addition, the nature of the fluvial record, the averaging of hominin activity through time and space has enabled broad chronological units of analysis to be compared and forces us to address behavioural patterns which are only visible at this scale. While this study has emphasised the uniqueness of the Clactoian this is as much due to the history of research and the geological context as evidence of a separate culture.

Conclusion

This thesis sought to investigate the validity and nature of the British Clactonian assemblages by considering them against a wider European Middle Pleistocene backdrop, something that had not been previously undertaken. As a result I have demonstrated that, for a varity of reasons, the Clactonian assemblages in the Thames Valley during the first half of the Hoxnian interglacial do stand up to scrutiny as a phenomenon worthy of further discussion. However, as an assemblage that lacks bifaces the Clactonian is not unique. There are other non-biface assemblages elsewhere in Europe, but none of these compare to the Clactonian technologically, chronologically and contextually.

Nevertheless, although the Clactonian cannot be explained away, it cannot continue to take on a life of its own. I have argued that it does not make sense to describe the Clactonian as a culture, nor is the result of cultural migration. Similarly it cannot be explained by raw material differences or as an artifice of the record, and, although an attractive explanation, there is insufficient evidence to explain it as a ‘pioneer’ phenomenon.

However, within a broader pan-European framework the Clactonian is not necessarily so unusual. By considering the concept of the Default flaking Pattern I have explored how initially dissimilar assemblages may have a common explanation. Through this we can view the Clactonian as part of a general pattern of technological flexibility and adaptation that is seen throughout Middle Pleistocene Europe, rather than a phenomenon that stands out from a handaxe –dominated norm.

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APPENDIX 1: Climatic reference table

Pleistocene	MIS	Dates (mya)	U.K.	N. Alps	Continental glaciations	Northern Europe	Poland	Faunal complex	Sites
Upper	**5e**	0.13-0.08	Ipswichian	Riss-Wurm	Eem	Eemian	Eemian	Eemian	Bolomor
Middle	**6**	0.19-0.13	Wolstonian	Riss	Warthe	Warthe	Watanian	Saalian	Bolomor
	7	0.25-0.19	Wolstonian		Treene	Saale/Drenthe/Karlich	Lubavian		Bolomor
	8	0.3-0.25	Wolstonian		Saale	Drenthe	Odranian		Bolomor
	9	0.34-0.3	Hoxnian	Mindel-Riss	Elster-Saale	(Domnitz) Holsteinian interglacial	zbójnian	Holsteinian	Bolomor Menez Dregan?, La Micoque? Rusko 33, Rusko 42 Vertesszolos? Purfleet
	10	0.35-0.34	Hoxnian			(Fuhne) Holsteinian	Liviecian		Purfleet
	11	0.43-0.35	Hoxnian			(Holsteinian) Holsteinian interglacial	Mazovian		Tzrebenica 2, Vertesszolos? Menez Dregan?, La Micoque? Clacton, Swanscombe, Barnham, Beeches Pit
	12	0.48-0.43	Anglian	Mindel	Elster	Elster 1	Saanian 1		
	13	0.51-0.48	Cromerian			Elster 1/2		Elsterian	Menez Dregan? Tzrebenica 2
	14	0.56-0.51	Cromerian			Elster	Saanian 2	Cromerian	
	15	0.63-0.56	Cromerian			Cromerian	Malopolanian		Tzrebenica 2

APPENDIX 2 - GAZETEER OF SITES

The sites are presented by country in alphabetical order.

CZECH REPUBLIC:

BEČOV I-B, near Most, NW Bohemia (Fridrich 1976; Oliva 2005; Svoboda, Ložek, and Vlček 1996; Valoch 1996)

Date – The lower levels (Bečov IB) are believed to date to c. MIS 13, while the upper archaeological levels are believed to correspond to MIS 8 through to 4. The main occupation at the site, though, is believed to date to MIS6/7 and represent the Early Middle Palaeolithic in the area.

Handaxes – Are present in some levels.

Geographical location and climate – The site is located on Písečny Vrch (literally hill of sand) which consists of tertiary quartzite. The site may originally have consisted of deposits accumulating in a rock shelter (Valoch 1996) although the deposits are now exposed on the hill slope.

Stratigraphy – Three archaeological levels were recovered. The upper level with 107 artefacts has a 'Bruhn' type soil, level two is a sandy desposit with 119 artefacts and the lower level III consists of a tuff, this contains fewer artefacts.

Archaeology

Excavation – The site was discovered by Fridrich and the I-B section was excavted into deposits that were probably preserved as they had originally been associaed with a rock shelter although they are now exposed slope deposits (Valoch 1996).

Lithics – The lithics are on coarse grained quartzite which is locally available. Lithics include choppers, polyhedrons, various scraper-like retouched pieces and some bifacially retouched pieces. The Middle Palaeolithic industry of the upper levels typically lacks handaxes and levallois technique is relatively rare. The Middle Palaeolithic Bečov type assemblage also contains quinson type points.and

Fauna – Unknown.

Interpretation – The main assemblage is interpreted as early Middle Palaeolithic.

BRNO-ČERNOVICE (Oliva 2005)

Some *archaic* artefacts were discovered at this site during extraction of sand from a Tuřany terrace.

BRNO-ČERVENÝ KOPEC, see ČERVENÝ KOPEC

BRNO-DOMINIKÁNSKÉ PLACE, see DOMINIKÁNSKÉ NÁMĚSTÍ

BRNO-STRÁNSKÁ SKÁLA (see STRÁNSKÁ SKÁLA I)

ČERVENÝ KOPEC, Brno-Bohunice, Moravia (Klíma 1963; Oliva 2005; Svboda, Ložek, and Vlček 1996; Svoboda *et al*. 1994; Svoboda, Ložek, and Vlček 1996; Valoch 1977)

Date – Pre Matuyama/Brunhes to MIS 9. There are also more recent Middle Palaeolithic occupations at the site.

Handaxes – None from these levels.

Gegraphical position and climate – Fluvial deposits, open air site.

Stratigraphy – Also known as *Red Hill* this location has possibly the most complete sequence of Pleistocene fluvial sediments in Central Europe

Archaeology

Excavation – Investigated by Valoch in the 1970s and 1960s.

Lithics – A single possible pointed chopper in quartz was found in a reversed polarity level below the Matuyama/Brunhes (Svoboda *et al*. 1994 cited in Svoboda *et al*. 1996). Around the polarity reversal level a possible quartz pebble core was recovered (Valoch 1977), along with a few flakes slightly higher in the sequence that are dated to c. MIS 9 (Klíma 1963 as cited in Svoboda *et al*. 1996). The main interest at this site is the later *Bohunician* occupations

Fauna – Unknown

Interpretation – The finds are too few to warant any complex interpretation.

DOLNÍ KOUNICE, Moravia (Svoboda, Ložek, and Vlček 1996; Valoch 1991)

Isolated find believed to date to c. Matuyama – Bruhnes boundary (Valoch 1991 as cited in Svoboda *et al*. 1996)

DOMINIKÁNSKÉ NÁMĚSTÍ, Brno (Oliva 2005)

Several flakes and a pebble tool were found in soil horizon dating to a younger part of the Holstein interglacial. Traces of a hearth were also found (Oliva 2005).

IVAŇ, Moravia (Svoboda, Ložek, and Vlček 1996; Valoch 1982)

Isolated find believed to date to c. Matuyama – Bruhnes boundary (Valoch 1982 as cited in Svoboda *et al*. 1996).

JIČÍN, NE BOHEMIA (Fridrich 1976)

A few quartzite artefacts were found in an erosional trench possibly associated with horse and mammoth remains.

KŮLNA CAVE, near Sloup, Moravia (Molines 1999; Moncel 2003; Oliva 2005; Svoboda, Ložek, and Vlček 1996; Valoch 1988; Zelinková 1998)

Date – Estimated as Middle Palaeolithic, from the Eemien interglacial with archaeological layers until the Upper Palaeolithic.

Handaxes – Small Micoquian-type handaxes from the upper levels, the lower levels do not have handaxes.

Geographical location and climate – A tunnel cave site on the eastern slope of the Sloup valley in the northern Moravian karst, with a number of stratified archaeological levels.

Stratigraphy – A number of stratified archaeological levels are present. Of interest here level 14 of the cave, the lowest archaeological level, is reported as dating from the late Rissian, layer 11 dates from the penultimate interglacial.

Archaeology

Excavation – The first excavations were undertaken here by Wankel in 1881 and subsequently (1881-1886) by Kříž who within a few seasons declared the cave to be archaeologically exhausted. However Knies, continued excavating intermittently from 1887 until 1913. Apart from minor disturbances when the cave was used as a Nazi aircraft factory between 1943 and 1945 the site was not subject to further excavation until Valoch in 1959, who then continued with more prolonged excavations between 1961 and 1976. These subsequent excavations yielded the greatest number of Neanderthal remains and the largest Middle Palaeolithic assemblage in the Czech Republic.

Lithics – The lowest level assemblage (from level 14), although limited to a few artefacts consists principally of side scrapers. The assemblage from level 11 consists of small sized (average 30mm) side scrapers and denticulates. Some Levallois is present but bifaces are absent from these lower levels. The industry is made on local quartz and chert. It was non-cortical chert flakes that seem to have been most utilized. (Oliva 2005; Valoch 1988)

Fauna – Neanderthal remains have been found at the site from higher levels than those discussed here. Temperate species have been found in level 11 such as *Alces alces, Equus taubachensis, Cervus elaphus, Bos sp., and Rhinoceros sp.* (Zelinková 1998).

Interpretation – The industry is described as Tabuchien (Valoch 2003) in the lower levels and Micoquian in the upper levels (Oliva 2005; Svoboda, Ložek, and Vlček 1996).

MLADEČ CAVES (Oliva 2005; Valoch 1996)

Date – The site contains deposits dating from the Lower through to the Upper Pleistocene.

Geographical location and climate – These caves are part of a system of caves in the Devonian limestone of Třesín Hill, which dominates the Upper Moravian Plain.

Stratigraphy – Upper Pleistocene deposits were more or less completely removed by earlier investigations. Middle Pleistocene deposits dominate the central part of a domed area inside the caves. The earliest investigations were focused on a large debris cone from a chimney in the roof of the dome. The Lower/Middle Palaeolithic archaeological finds are limited.

Archaeology

Excavation – Finds of artefacts and bones have been reported from this site since the early 19th century although it was excavated more systematically by Szombathy in the late 19th century. From 1903 Knies continued the excavation. Smyčka described more finds following a disturbance in the early 1920s. Further limited observations were made by Skutil in the 1930s, Jelínek in the 1980s and Horáček and Ložek in the later 20th century. These explorations were primarily palaeontological.

Lithics - A ‘core-like artefact’, limonite flake and a chopper believed to be of Lower/Middle Palaeolithic age were found in the dome deposits and a knapped quartz pebble was found unstratified in a tunnel nearby (Oliva 2005).

Fauna - Mainly Middle Pleistocene Fauna, with some Upper Pleistocene fauna over limited area elsewhere in the cave. The fauna assocaited with the few lithic finds described above is Middle Pleistocene.

Interpretation – The Middle Pleistocene artefacts are too few and too poorly stratified to be significant.

MLAZICE, nr Mělník, Bohemia (Svoboda, Ložek, and Vlček 1996; Valoch 1968; Valoch 1996; Zébera 1952)

Date – Unknown

Geographical location and climate – Surface finds.

Stratigraphy – None/unknown.

Archaeology

Excavation – Surface collection.

Lithics – 'Archaic' pebble tool industry.

Fauna - None

Interpretation - interpreted as *Heidelbergian* by Žebera in 1953 (Svoboda, Ložek, and Vlček 1996).

MUŠOV, Moravia (Svoboda, Ložek, and Vlček 1996; Valoch 1982)

Isolated find believed to date to c. Matuyama/Bruhnes boundary (Valoch 1982 as cited in Svoboda *et al*. 1996).

PRAHA-LETKY (Oliva 2005)

A single 'Clacton-type' flake found in a loam pit in stratigraphic position by F.Prošek. The discovery of this flake after the second World War helped identify the presence of Lower Palaeoltihic sites in Czechoslovakia aftern the previous denial of the existence of sites of this age by Absolon (Oliva 2005).

PRAHA-SUCHDOL (Fridrich 1976)

Associated with an interglacial reddish-brown soil (braunlehm) possible pre gunz date 12 aretfacts (3 side choppers, 3 end choppers, polyhedrons, 1 side scraper, 1 flake and 2 laterally trimmed flakes) were recovered. It was assigend to the(Fridrich 1976) Oldowan (Fridrich 1976).

PŘEZLETICE, near Prague (Fejfar 1976; Fridrich 1972, 1989; Svoboda, Ložek, and Vlček 1996; Valoch 1996)

Date – Hominin occupation of this site is believed to date to the early Middle Pleistocene on the basis of the fauna and microfauna.

Handaxes – Irregular and proto-bifaces are reported from all three archaeological horizons. However, although it is difficult to assess the nature of the artefacts from the illustrations, the majority of the bifaces do not appear to be valid from the illustrations/photos.

Geographical location and climate – The site is located just 20km NE of Prague. The marls containing the archaeology were believed to correspond to 'an early phase of the pre-Elsterian warm oscillation'(Fejfar 1976). The site would have been located close to a lake and it is suggested that lydite blocks found at the site would have provided an additional, natural 'wall-like' shelter.

Stratigraphy – The site has a series of systematically excavated layers, described as living floors (Svoboda, Ložek, and Vlček 1996). Archaeological artefacts have been recovered from 4 layers: "Al, a reddish-brown soil of braunlehm type with debris; A2, the top part of the marls, with solifluction phenomena and gley soils (48 specimens, amounting to 14.33%); A3, a lacustrine marl (180 specimens, amounting to 53.73%); and A4, silty, weakly clayey sands underlying the lacustrine marls (107 specimens, amounting to 30.14%)." (Fejfar 1976).

Archaeology

Excavation – The site was first described and investigated by Vlastislav Zazvorka of the National Museum, Prague in 1938. from 1967 the site was excavated as an archaeological rather than palaeontological site by Jan Fridrich (1989) in close colaboration with O. Fejfar who had been investigating the site since 1964.In addition to the rich faunal remains and lithics Fridrich also claimed the presence of a Lower Palaeolithic dwelling in the form of a 3m by 4m oval structure constructed of phthanite rock and loam and associated with a small hearth (Fridrich 1989, Svoboda, Ložek, and Vlček 1996). This claim however is controversial.

Lithics – The industry is coarse due to the nature of the locally available lydite raw material from which the majority of the tools were made, quartz was also used from the veins present in the local rocks. Pebbles of quartz and quartzite from the local river gravels were used but less often (Valoch 1996). Fejfar notes a similarity with the assemblage from Olduvai bed II and also with Ubeidya IV A. There are 4 levels with archaeological material, the richest level, A3, is reported to contain 470 artefacts (Fridrich 1989). A1 contains 77 artefacts and A2 46 lithic artefacts. Irregular and proto-bifaces are reported from all levels, although the illustrations are difficult to see clearly whether these artefacts are indeed bifaces. Bone tools are also reported (Fridrich 1976, 1989).

Fauna – Present but unknown.

Interpretation – Dubbed 'Přezletician' or 'Proto-Acheulean' by some authors (Fejfar 1976, Fridrich 1972). Fejfar interprets the assemblage as indicative of a movement of early Acheulean people into temperate Europe at c. 700,000 years ago (1976). From photos it seems that the anthropic nature of some of the artefacts is questionable, and that the assemblage is certinly a non biface one despite reports of some bifaces – however the size of the actual artefactual assemblage is probably fairly small.

PŘIBICE I, Břeclav, southern Moravia (Oliva 2005; Svoboda, Ložek, and Vlček 1996; Valoch 1996; Valoch, Smolíková, and Zeman 1978)

Date - Mindel by geological association (Valoch *et al*. 1978).

Handaxes – Absent.

Geographical location and climate – The site is located south east of the village of Přibice around 25km south of Brno on the east bank of the Jihlava River. The site is situated on the edge of a plateau that forms part of a terraced plain (Valoch, Smolíková, and Zeman 1978).

Stratigraphy – Geological studies suggest that the artefacts are lying within a soil on the terrace deposits rather than within them. The terrace deposits are considered to belong to the Gunz and the overlying soil containing the artefacts to a wamer period in the Gunz/Mindel or Cromer interglacial (Valoch, Smolíková, and Zeman 1978).

Archaeology

Excavation – Artefacts were first identified at the site by an amateur archaeologist, Václav Effenberger, who working with the Moravian Museum collected stones he considered to be artefacts (Valoch, Smolíková, and Zeman 1978). The artefacts collected by Mr Effenberger were later studied by Valoch (1978).Tools were found over an area of c. 200 by 500m in ploughsoil mixed up with alluvial gravel (Valoch, Smolíková, and Zeman 1978). In 1975-1976 a gravel pit was opened on the eastern slope of the plateau which enabled geological observations and micromorphological studies to be undertaken (Valoch, Smolíková, and Zeman 1978). These studies helped to demonstrate that the artefacts were in fact located on the terrace surface rather than within the deposits themselves (*ibid.*).

Lithics – The artefacts are made on pebbles from alluvial deposits, mostly quartz, quartzite and hornstone. The assemblage consists of: choppers and chopping tools (105 <10cm, 15>10cm); scrapers on pebbles (127 <10cm, 28>10cm); cores and flakes and flake tools (largely side scrapers).

Fauna – Unknown.

Interpretation – Valoch *et al*. (1978) consider the assemblage to represent the working of smaller (<10cm) pebbles by choice in a manner similar to those observed elsewhere in the region in the *Bohemiam* described by Žebera. However the site is a limited surface collection of a Middle Pleistocene pebble tool industry.

RAČINÉVES, Central Bohmemia (Fridrích and Sýkorová 2003; Tyráček *et al*. 2001)

Date – The bottom part of the terrace, at the top of which the archaeological deposits occur, has been morphostratigraphically dates to the early Mindel (Fridrích and Sýkorová 2003). The microfauna suggests that the site must be younger than 600kya (Fridrích and Sýkorová 2003).

Handaxes – none

Geographical location, climate and stratigraphy – The site is located c. 45km to the north of Prague in Central Bohemia on an ancient floodplain of the Vltava River (Moldau) 224m above sea level. The archaeological remains come from a substantial river terrace deposit that has been quarried at this location. The upper 1-2m of the terrace deposit in which the archaeology is found represent the sediment of a meandering interglacial river (Fridrích and Sýkorová 2003). Faunal remains indicate the presence of open woodland and ox-bow lakes nearby which gradually become fenland. In places the open grassland seems to have become arid steppe.

Archaeology

Excavation – The investigations at this site were undertaken at the same time as gravel extraction and a large area of the site was destroyed before it could be properly investigated. However an area of 1750m^2 was investigated with 200m^2 of this in trial trenches.

Lithics – The density of artefacts was low with only 192 recovered. These were primarily manufactured on locally available quartz pebbles but quartzite, granite and basalt were also occasionally used. The artefacts appear to have been manufactured at the site. The cores are described as 'characteristic of Middle Palaeolithic core preparation techniques' (Fridrích and Sýkorová 2003: 96) and the majority are described as exhausted. There is also evidence of Levallois. However choppers make up c.30% of the assemblage, retouched tools c. 25%. The industry is small – an average length of 48mm, although this is apparently skewed by the presence of a few much larger artefacts including a large basalt bifacial chopper (Fridrích and Sýkorová 2003).

Fauna – The mammalian fauna are interpreted as being largely the remains of hominin subsistence: *Cervus elaphus* (37%), bovids (31.5%), Rhinoceros (17.8%). Carnivores (*Vulpes sp.* and *Canis sp.*) make up less than 2% of the faunal assemblage. The bones found were largely those from the head, neck, forelimbs and vertebrae. Some of the bones displayed evidence of burning (Fridrích and Sýkorová 2003).

Interpretation – Hearths were found, although not much information is given regarding the precise nature of these. The industry is interpreted as being later Lower Palaeolithic 'between the industries of the Visogliano and Bilzingslebn types' (Fridrích and Sýkorová 2003: 94).

RŮŽENIN DVŮR, Moravia (Svoboda, Ložek, and Vlček 1996; Valoch 1977)

Single artefacts were found from levels believed to correspond to MIS 13-9 (Valoch 1977 as cited in Svoboda *et al.* 1996).

SEDLEŠOVICE, Moravia (Svoboda, Ložek, and Vlček 1996; Valoch 1981)

A single quartz pebble core was found in a level belived to correspond to MIS 11 (Valoch 1981 as cited in Svoboda *et al.* 1996).

STARE MESTO (SITE 1), Moravia (Molines 1999; Svoboda, Ložek, and Vlček 1996)

Date – The assemblage is dated to the late/final Lower Pleistocene. A second series contains artefacts from surface collections and is considered to date from the Middle-Lower Pleistocene (Cromer-Mindel). The associated fauna is described as Biharian (Svoboda, Ložek, and Vlček 1996).

Handaxes – some reported

Geographical location and climate – A locality consisting of three open air sites, site 1 being the most important.

Archaeology

Excavation – The site was discovered in 1987.

Lithics – Only 52 artefacts have been found from the oldest series at the site. The tools are mainly in flint and consist of choppers, heavy duty scrapers, notches and utilised flakes and small discoidal pieces. A second series of surface collections is on flint quartz and is made up of choppers of various types, proto-bifaces, handaxes and cores. There are also flake tools with light duty scrapers, burins, notches and denticulates. The most recent series III is dated to the end of the Middle Pleistocene and only differs from series II in the lack of pebble tools.

STRÁNSKÁ SKÁLA I, Brno-Slatina, Moravia ***(Fridrich 1976; Musil and Valoch 1968; Oliva 2005; Roebroeks and van Kolfschoten 1995; Schirmeisen 1926; Svoboda, Ložek, and Vlček 1996; Valoch 1996; Woldřich 1916)***

Date – c. 600,000 by faunal assemblage

Handaxes – Handaxes are absent, but overall the artefacts are dubious.

Geographical location and climate – The site is located in a Jurassic limestone cliff to the east of Brno and consists of a number of caves on a slope. Within the limestone are layers of chert which was exploited throughout the Palaeolithic and into the Neolithic (Svoboda, Ložek, and Vlček 1996). The rock slopes at the northwest edge of the site are flanked by Lower to Middle Pleistocene slope deposits (site I) with Upper Pleistocene loess at the northern margin (site IV)(Svoboda, Ložek, and Vlček 1996). The remains of terraces, Pleistocene soils, limestone debris and loess cover the upper part of the elevation (sites II and III) (Svoboda, Ložek, and Vlček 1996). It is site I that is of interest here. The environment is described as an interglacial park-like forest environment with nearby river (Svoboda, Ložek, and Vlček 1996).

Stratigraphy – The finds from site I were made on the slope sediments and in small caves. The artefacts in cave 4 are associated with sediment corresponding to an interglacial with Upper Biharian fauna. The artefacts from the slope, level 14, are from the end of the sequence, and possibly associated with the Middle or Later Pleistocene.

Archaeology

Excavation – The site was first excavated in 1910 by the geologist J. Woldrich following the discovery of 'cave 8' during limestone quarrying. He recovered numerous remains of Lower Pleistocene fauna (Woldřich 1916 as cited in Svoboda *et al*. 1996) and also claimed to have discovered evidence for hearths (See summary and citation in Musil and Valoch 1968). However, given that no subsequent investigations have provided any evidence to support these claims Woldrich was possibly confusing manganese staining for evidence of burning. The site, principally the slope, was further investigated by Knies, Čapek, Schirmeisen and Absolon until the end of the 1920s. Although Absolon discounted all Middle and Lower Palaeolithic evidence from Moravia, Schirmeisen claimed to have identified some items of chipped hornstone as tools (1926). Between 1957 and 1972 the site, both the slope and caves 8 and 4, was excavated by Musil. During these excavations worked Jurassic chert was identified alongside the bones. This material was studied by Valoch in the 1960s, 70s and 80s before he undertook archaeological investigation from 1996 to1998.

Lithics – The lithics consist of local chert/hornstone fragments without clear traces of working, with the exception of a few from Cave no. 4 and from the talus slope (Musil and Valoch 1968; Schirmeisen 1926; Svoboda, Ložek, and Vlček 1996). Some of the 'artefacts' are stratified from level 14 of the slope and area D of stratum d cave 4. Valoch suggests that some are made from chert that is different from the locally available material but it is agreed that natural transportation of this material must be disqualified before their presence can be considered to be the result of human behaviour. (Roebroeks and van Kolfschoten 1995; Svoboda 1987). There is also a more recent Upper Palaeolithic settlement at the site.

Charred bones and lithics have been reported from the site (e.g. Oliva 2005) but these are disputed by others (e.g. see Svoboda, Ložek, and Vlček 1996).

Fauna – Faunal remains are abundant with over 80 species of mammals and the same of birds. Early Pleistocene characterised by *Machairodus.* Also *Homotherium moravicum*, forest elephant, rhinoceros, horse, cervids, bovids, hyenas, bears and canids are present. These are characteristic of younger period of the Cromer interglacial (Oliva 2005). The faunal assemblage associated with the lithics is described as Biharian (Svoboda, Ložek, and Vlček 1996)

Interpretation – Overall the interpretation of the artefacts is controversial. Even those that are artefactual are so few in number, about a dozen, and so spread out that their stratigraphic integrity cannot be confirmed. The site is an extremely complex one, with complex stratigraphy and more recent occupation making the picture even less clear.

ŠVÉDSKÉ ŠANCE, Brno-Slatina (Oliva 2005; Valoch 1996)

Part of the Stránská Skála complex, a cutting from which two quartzite pebbles have been found from bed 3 and another possible pebble tool has also been found from beds 9 and 14.

ZNOJMO-SEDLEŠOVICE (Oliva 2005)

This findspot is a loam-pit which yielded a chipped quartz pebble from a soil horizon dated to the Mindel-Riss or Holstein interglacial c. 460-300kya.

ENGLAND:

BARNFIELD PIT, see SWANSCOMBE - BARNFIELD PIT

BARNHAM ST. GREGORY, Suffolk (Ashton *et al*. 1994; Ashton, Lewis, and Parfitt 1998; Bowen 1998; Debenham 1998; McNabb 1998, 2007; Parfitt 1998; Patterson 1937, 1942; Rhodes 1998; Wenban-Smith 1998; Wymer 1985)

Date – Dates for deposits at this site have been obtained with: amino acid racemisation – 364-427ka (Bowen 1998); thermoluminescence - 286+-18ka (Debenham 1998); electron spin resonance – 200-300ka with a maximum of 430ka (Rhodes 1998); and from associated faunal remains suggest a Hoxnian (MIS 11) date (Parfitt 1998).

Handaxes – A limited number of complete handaxes are present but there is evidence of their manufacture from two of the four areas in which archaeology was found. The 'Acheulian' and 'Clactonian' assemblages appear to be spatially rather than temporally distinct, as had previously been thought.

Geographical location and climate – The site is within a brick pit at East Farm, Barnham St. Gregory, Suffolk, eastern England. The deposits containing archaeology are within a deep channel cut into the chalk. The base of this sequence is filled with glaciofluvial sand and gravel followed by chalky diamicton which are considered to have been deposited during the Anglian (MIS 12, c. 427-474ka). The archaeological layers appear to be associated with the edge of this channel after it had largely filled up in deposits attributed to the Hoxnian interglacial. The archaeology comes from a number of areas within the pit although the Clactonian artefacts come primarily from 'Area I' of the British Museum excavations.

Stratigraphy – The stratigraphy at the site is complex, however the basic sequence is as follows. A deep channel was incised into the chalk, this was filled with sand and gravel, in turn overlain by chalky diamicton. A channel eroded into these Anglian deposits which then filled with fine silts and clays, probably at the end of the Anglian, onset of the Hoxnian. The channel bank collapsed on the southern side of the channel and a cobble layer formed over the top of the resulting brown diamicton, winnowed by running water. It is on and within this cobble level that the majority of artefacts were found. A yellow silty sand overlies this cobble layer and seems to have been where the majority of faunal material from area III was recovered. Over all this a soil formed, probably when the channel moved or dried out, this layer was associated with the handaxes (McNabb 2007). However the sequence is not quite this simple and handaxes and associated debitage were found in layers more closely associated with the cobble layer from which the 'Clactonian' material was found.

Archaeology

Excavation – Following some early observations and collections (see McNabb 1998 for a summary) this site has been subject to three main excavations. Firstly Paterson's excavation in the 1930s (Patterson 1937, 1942), secondly Wymer's excavation in 1979 (Wymer 1985) and finally the British Museum excavation between 1989 and 1994 (Ashton *et al*. 1994, Ashton, Lewis, and Parfitt 1998).

Lithics – There are broadly two groups of lithics from different deposits within four areas of the pit. The first, primarily from the cobble layer in areas I, IV and V contains artefacts that are variously rolled, suggesting post depositional movement and reworking. This first, rolled series consists of the 'Clactonian' cores and flakes. The second group of lithics has been recovered from all the areas (I, III, IV and V) and show limited edge damage. There are also several refitting groups from this series of artefacts, although there is some evidence that these artefacts have moved slightly. A small assemblage from area III though does seem to represent an *in situ* deposit.

The second, fresh series of artefacts varies in composition between areas. In Area I, the assemblage rests on the cobble surface from which the raw material appears to have been sourced, it consists of cores and flakes and flake tools. Area IV is also on and within the cobble layer with much of the knapping similar to Area I but with a lower proportion of flake tools. However, Area IV has evidence of biface manufacture and a completed biface. The area V fresh material lies on the surface of a grey-brown stony clay, not far from the raw material cobble source. Again this area has both core and flake and biface working, although there are no bifaces and the debitage seems to be from the later stages of knapping. In Area III, primarily a faunal assemblage, the material appears to be *in situ* although there is no evidence it was knapped at this spot.

Fauna – Barnham has provided a rich micro- faunal assemblage (*Plecotus sp.*, *Sorex minutus, Neomys sp., Crocidura sp., Talpa minor, Desmana moschata, Oryctolagus cf. O. cuuniculus, Sciurus sp., Clethrionomys glareolus, Arvicola terrestris cantiana, Microtus(terricola) cf. subterraneus, Microtus agrestis, Microtus arvalis, Apodemus sylvaticus, Apodemus maastrichtiensis*) of great importance given the scarcity of Hoxnian micro-fauna assemblages elsewhere (Parfitt 1998). The larger fauna is more scant but includes bear (*Ursus sp.*), polecat (*Mustela cf. M. Putorius*), lion (*Panthera leo*), elephant (*Palaeoloxodon antiquus*), rhinoceros (*Stephanorhinus sp.*), wild boar (*Sus scrofa*), fallow deer (*Dama dama*), red deer (*Cervus Elaphus*), and a bovid femur which shows signs of cutmarks and deliberate fracture (Parfitt 1998). Overall the faunal assemblage indicates

" an environment of deciduous or mixed woodland with dense ground-level cover and areas of more open grassland or marsh bordering a large body of water" (Parfitt 1998:136)

Interpretation – Previously the site had been interpreted as one of the few where there was an interstratification of Clactonian and Acheulean assemblages, supporting the thesis that they represented different groups of hominins at different times. However, the variation in assemblages that are considered to be penecontemporaneous across a landscape has led to an alternative interpretation of the traditional 'Clactonian' core and flake vs. 'Acheulean' biface dilemma. Rather than seeing the two assemblages as representative of two groups or different times the British Museum excavators have interpreted the different assemblages as the result of a differing use of the landscape (Ashton, Lewis, and Parfitt 1998). This 'penecontemporaneous interpretation' has not gone unquestioned and Wenban-Smith has argued that the 'Acheulian' and 'Clactonian' assemblages could be separated by a considerable period of time and therefore any consideration of them within a single behavioural landscape interpretation is unreasonable (Wenban-Smith 1998).

CLACTON-ON-SEA, Essex

Clacton-on-Sea in Essex is the type site of the infamous British NBA the Clactonian. It is actually a series of localities over c. 3km along the coast from West Cliff in the north east to Jaywick Sands in the southwest. The research here, and the term Clactonian , was pioneered by Hazzledine Warren in the first few decades of the 20th century.

CLACTON-ON-SEA - BUTLINS HOLIDAY CAMP, Essex (Bridgland *et al*. 1999; McNabb 2007; Singer *et al*. 1973)

Date – MIS 11

Handaxes – No bifaces were recovered from this locality

Geographical location and climate – This locality is located near to the southern bank of the main Clacton channel. The site shows evidence of a marine ingression in MIS 11 in pollen zone Ho IIc/IIIa, slightly earlier than reported from other locatlities.

Stratigraphy – At the base of the sequence unit 1 was a sandy gravel, containing artefacts and fauna, associated with the Lower Freshwater Beds. This was overlain by unit 2, silt/clayey silt with a large number of shells near its base equated with Upper Freshwater Beds. The Estuarine Beds were represented in unit 3 but this was only present in one corner of the site as orange clayey silt. Unit 4 overlying this was hard brown clay

Archaeology

Excavation – The Pleistocene deposits at this site were exposed during drainage works on the old Butlins site and recorded by Bridgland *et al*. (1999).

Lithics – 'Clactonian' assemblage without bifaces – flint cores and flakes.

Interpretation – Secondary context hominin occupation of the Clacton Channel river banks.

CLACTON-ON-SEA - GOLF COURSE, Essex (Keeley 1980; McNabb 2007; Singer *et al*. 1973; Wymer 1968a, 1974, 1976, 1985)

Date – MIS 11

Handaxes – Apart from a single non-classic biface there is no evidence for handaxes at this locality.

Geographical location and climate – The excavators interpreted the fresh material from this site as hominins using the gravel surfaces, probably a gravel bar, adjacent to the river.

Stratigraphy – At the base of the stratigraphic sequence was a deposit of c. 1m of sandy gravel, containing artefacts and fauna and corresponding to the Lower Freshwater Bed. Overlying this was a marl (calcareous silty clay) which corresponds to the Upper Freshwater Bed. Overlying the marl was a patch of gravel with artefacts and fauna, this patch of gravel was localized, c. 0.1-0.2m thick and probably soliflucted material from the bank. The whole sequence was overlain by a brown clay. Clactonian artefacts were found in both the marl and the gravel and refitting between these layers suggests that the artefacts in the marl probably derived from those left on the gravel surface.

Archaeology

Excavation – This site was excavated by Wymer and Singer in 1969 and 1970 (Singer *et al*. 1973). The Golf Course locality is also the only locality amongst the Clacton sites with *in situ* archaeology.

Lithics – There are both rolled and fresh artefacts present at this locality, all cores and flakes.

Fauna – *Trogontherium cf. cuvier, Clethrionomys sp., Microtus cf. agrestis, Palaeoloxodon antiquus, Equus caballus, Dicerorhinus hemitoechus, Dama dama, Cervus Elaphus* and bovid.

Interpretation – The excavators interpreted this locality as a single site of *in situ* use of a gravel surface, adjacent to a watercourse. The site was then partially disturbed. However, McNabb (2007) suggests that rather than a single disturbed primary context site the locality the excavated material is the result of the long term use of the river bank by hominins, as demonstrated by the more or less continuous presence of rolled artefacts. The fresh material is simply the result of the most recent activity in this continuum, this is supported by the presence of some reworking of older rolled pieces.

CLACTON-ON-SEA - JAYWICK SANDS, Essex (McNabb 2007; Oakley and Leakey 1937; Wymer 1968a, b, 1974, 1985)

Date – MIS 11

Handaxes – No handaxes have been found from the basal gravels.

Geographical location and climate – The distribution of the artefacts throughout the gravel (Lower Freshwater beds) and their rolled nature indicates that this is a purely secondary context site associated with a river channel.

Stratigraphy – A sequence of fluvial and estuarine gravel and loam deposits are present. Higher loams representing hillwash overly variegated loams represnting the Estuarine Beds. These loams in turn overly the marls and sand of the Upper Freshwater Beds which themselves overly the reddish gravel of the Lower Freshwater Beds.

Archaeology

Excavation – The Jaywick Sands site was excavated in 1934 by Kenneth Oakley and Mary Leakey (Oakley and Leakey 1937). They excavated seven test pits across the palaeo-channel along with a further two test pits and nearby house foundation trenches.

Lithics – The assemblage consists of rolled cores and flakes.

Fauna – *Palaeoloxodon antiquus, Equus caballus, Dicerorhinus hemitoechus, Dama dama, Bos primigenius, Bison priscus.* Elephant, giant ox and fallow deer are the most common, horse is rare (Wymer 1985).

Interpretation – Interpreted as a Clactonian site in secondary context.

CLACTON-ON-SEA - LION POINT, Essex (McNabb 1992, 2007; Warren 1932; Warren 1951; Wymer 1968a, b, 1974, 1985)

Date – MIS 11

Handaxes – Warren records two non-classic bifaces from the Clacton channel deposits at Lion Point. McNabb also reports a classic biface from the same area found in 1944 (McNabb 2007).

Geographical location, stratigraphy and climate – The artefacts were all collected from secondary context river channel deposits. The site represents deposits in the middle of an ancient river channel, possibly a deeper part of the same channel observed at Jaywick Sands. The gravels at the base represent the Lower Freshwater Beds, the marls represent the Upper Freshwater Beds.

Archaeology

Excavation – The foreshore at Lion Point had been monitored by Warren since 1911 but it was not until 1932 that he published his findings.

Lithics – The assemblage has been described as 'more Clactonian than any other Clactonian assemblage' (McNabb 2007: 311) but this is possibly due to the fact the material was collected, and thus selected (*ibid.)*.

Interpretation – A Clactonian site in secondary context.

CLACTON-ON-SEA - WEST CLIFF, Essex (Bridgland 1994; Bridgland *et al*. 1999; McNabb 1992, 1996, 2007; Pike and Godwin 1953; Warren 1923, 1932, 1955; Wymer 1968a, 1974, 1976, 1985)

Date – MIS 11

Handaxes – From Warren's notebooks he associated three handaxes with the Freshwater beds (McNabb 2007). Apart from these handaxes are absent.
Stratigraphy – Another secondary context location although the deposits are likely to be less reworked than those at Lion Point and Jaywick Sands. The Clactonian artefacts and fauna were found in the Lower Freshwater Beds, flinty gravels in clay matrix at the base of the sequence. Overlying this was the sands and clays of the Upper Freshwater Beds, in turn overlain by Estuarine Beds, again consisting of clays and sands. The Estuarine Beds record the rising of the sea level and the lower part of the river at Clacton becoming part of the Thames estuary. The Lower Freshwater Beds at West Cliff are nick-named the Elephant Beds or *Elephas antiquus* gravels after the abundant remains found within them and reflect a partially wooded, temperate environment.
Archaeology
Excavation – The locality at West Cliff is where Warren originally began collecting artefacts. West Cliff also was the site for which the first British Middle Pleistocene Pollen diagram was produced (Pike and Goodwin 1953).
Lithics – The 'Clactonian' core and flake industry was recovered from the basal gravel deposits – the Lower Freshwater Beds.
Fauna – The abundance of faunal remains at this site is attested by the assigned name 'elephant beds'. The Freshwater Beds contained large mammal fauna indicative of a fully temperate, partially wooded environment: elephant, rhinoceros, bovid and deer.
Interpretation – The material recovered from the Freshwater Beds at West Cliff is in secondary context, however it represents hominin use of the river bank and the even distribution of artefacts throughout the deposit would suggest this occupation had been regular over a considerable period of time. Despite the apparent presence of handaxes at the site the assemblage from the Freshwater Beds is widely considered to be Clactonian.

CUXTON, 15 ROCHESTER ROAD, Kent (Bridgland 2003; Cruse 1987; McNabb 2007; Tester 1965; White 2000)

Date – Bridgland's interpretation of the gravel deposits suggests that the lower archaeological assemblage dates to early MIS 9 (Bridgland 2003).
Handaxes – There is a substantial handaxe assemblage from nearby sites (e.g. the Rectory) and abundant handaxes are also present in the upper gravels at the site.

Geographical location and climate – The site is located on the left bank of the Medway, a southern tributary of the Thames. The gravels at the site suggest the presence of a braided river system and possibly correlate with the Lynch Hill/ Corbets Tey Formation

Stratigraphy – The stratigraphic sequence at the ste consists of a series of fluviatile sands and coarse gravels from the Medway River within which are two series of archaeological deposits. The upper of the archaeological assemblages was abundant in handaxes, the lower assemblage lacked them completely.

Archaeology

Excavation – The upper part of the geological sequence present at the site was excavated by Tester in 1965. The site was subsequent investigated by Cruse in 1987 and more recently Bridgland has reassessed the geological interpretation.

Lithics – Only 118 artefacts have been recovered from the lower gravel. The excavator thought that there should be no distinction between the lower and upper assemblage given the similarity of the flaking and flake tools (Cruse *et al*. 1987) however more recently White has suggested that a distinction should be made (White 2000).

Fauna – Unknown

Interpretation – The small size of the assemblage makes it difficult to assess the significance of the assemblage, however White (2000) suggests that it may be comparable to the situation at Purfleet (see below).

LITTLE THURROCK GLOBE PIT, Essex (Bridgland and Harding 1993; McNabb 2007; Snelling 1964; Wymer 1957, 1985)

Date – The brickearth at Globe Pit relates to the Lynch Hill/ Corbets Tey Formation which is considered to date to MIS 9 (McNabb 2007).

Handaxes – There are reports of two handaxes from the gravel, however unfortunately these are part of a collection that has since been lost (McNabb 2007) and the character and context of these cannot be certain. Both McNabb and White agree that at least one of these bifaces is non-classic.

Geographical location and climate – This site is located on the northern side of the Lower Thames Valley. At the time of occupation the site was at the margin of a channel and probably represents material moved down the channel margin by the river. The material seems to correspond to human activity in the area during a cool early stage of MIS 9.

Stratigraphy – The Clactonian artefacts lie within a gravel which is overlain by the brickearth. The gravel itself overlies Thanet Sand. There are two conflicting interpretations of the deposits at Globe Pit. Firstly that there are two separate gravels which have been mixed by solifluction (e.g. Wymer 1985), secondly that there is a single sequence of bedded gravel and sand (Bridgland and Harding 1993).

Archaeology

Excavation – The site was a brickearth works in the late 19th and early 20th century. In the 1950s John Wymer excavated at the site and subsequently Snelling in the 1960s (Snelling 1964) and Bridgland and Harding in the 1990s (Bridgland and Harding 1993) have undertaken excavations there. There have also been a number sections cut and recorded at the site (see McNabb 2007 for examples). It was Wymer who first identified the site as a Clactonian one in the 1950s.

Lithics – Core and flake assemblage.

Interpretation – A non-biface assemblage.

PURFLEET GREENLANDS QUARRY, Essex (Bridgland *et al*. 1995; McNabb 2007; Palmer 1975; Schreve *et al*. 2002; Wymer 1985)

Date – MIS 10/9 (Schreve *et al*. 2002)

Handaxes – Handaxes and Levallois are present in the archaeological levels overlying the lower ‘Clactonian’ levels.

Geographical location and climate – Greenlands quarry is one of a number of Middle Pleistocene sites at Purfleet, on the northern side of the Lower Thames Valley. The site is on Thames terrace deposits and the ‘Clactonian’ occupation of the site is believed to have occurred at the very end of MIS 10 and beginning of MIS 9 when the climate was warming. The general environment was one of a large, slow flowing river with adjacent grassland, marshes and woodland (Schreve *et al*. 2002)

Stratigraphy – Chalk bedrock with evidence of frost fracture is as the base of the sequence, followed by 1m of angular chalk rubble, c. 0.4m of Little Thurrock Gravel, overlain by c. 0.75m of shelly gravel, then c.0.25m of silty clay, c. 2m of Greenlands Shell Bed, c. 6m of Bluelands Gravel, c. 0.75m of grey-brown silty clay and finally overlain by 2m of Botany Gravel. The Archaeology came from the Botany gravel, Bluelands Gravel and Little Thurrock/Shelly gravel (Schreve *et al*. 2002).

Archaeology

Excavation – Although the presence of sites in the area was known from an earlier date it was not until the 1960s when the pit was opened that the potential of the site was fully known. Palmer undertook a series of small excavations at the site and identified three gravel units each containing artefacts (Palmer 1975). Palmer considered all the artefacts to be from a single Middle Acheulean industry with a strong Clactonian component, Wymer however reinterpreted the material as representing three separate assemblages: Clactonian, Acheulean and Levalloisian (Wymer 1985). Following a series of trial trench excavations adjacent to Greenlands Quarry in 1993 ahead of site development (Bridgland *et al*. 1995), two sections were excavated in 1995 in the north east corner of the quarry itself (Schreve *et al*. 2002). Following the discovery of flint artefacts further work was undertaken in 1996 on the section and in 1997 a number of evaluation trenches were excavated ahead of a road extension (Schreve *et al*. 2002).

Lithics – The density of artefacts at this site is low with less than 50 having been recovered from the lower beds (dubbed 'Clactonian'). The assemblage from this lower level however consists of all cores and flakes with no handaxes or thinning flakes.

Fauna – There is a rich faunal assemblage from this site, however the levels containing the 'Clactonian' assemblage have very rare faunal remains.

Interpretation – The low number of artefacts makes it difficult to assess the nature of the assemblage. The artefacts appear to occur in low density across a wide area.

RAINBOW BAR, Hampshire (Draper 1951; Hack 1998, 1999, 2000, 2004, 2005; McNabb 2007)

Date – Unknown

Handaxes – Two non-classic handaxes

Geographical location and climate – The site is a gravel bar in the estuary where the River Meon enters the Solent. The bar is exposed at low tides. It is unclear whether the bar of fluvial (and therefore Plesitocene) or marine (and therefore Holocene) origin, although from a recent site visit a marine origin seems more likely.

Stratigraphy – Surface collection.

Archaeology

Excavation – The material has been collected from the surface of the exposed bar by Chris Draper in the 1950s (Draper 1951) and Brian Hack in the 1990s (Hack 1998, 1999, 2000, 2004, 2005).

Lithics – Both Draper and Hack have reported Lower Palaeolithic artefacts from this site. Draper suggested that the cores and flakes he recovered were evidence of a Clactonian element. Draper also reported the presence of Levallois, although McNabb

(2007) disagrees with the Levallois nature of the artefact in question. Hack (2004) has reported a few finds of handaxes from the site, although these are non-classic.
The site is a mixture of flintwork of indeterminate age. Mesolithic artefacts are also present and it is possible that much of the material is in fact of Holocene date.
Fauna – None.
Interpretation - Given the lack of dating or clear stratigraphy for the site, along with the ambiguity of the flintwork it is extremely difficult to establish the clear presence of a Lower Palaeolithic assemblage at the site that can be characterised in any confidence as Clactonian.

SWANSCOMBE - BARNFIELD PIT, Kent (Ashton and McNabb 1994; Bridgland 1994; Bridgland and Schreve 2001; Conway 1996a, b; Conway, McNabb, and Ashton 1996; Davis and Walker 1996; Dewey 1959; Hubbard 1982; Kerney 1971; Marston 1942; McNabb 1996, 2007; Ohel 1979; Schreve 2001, 2004; Smith and Dewey 1913; Waechter, Newcomer, and Conway 1970; Wymer 1964)
Date – MIS 11
Handaxes – A few thinning flakes and one definite hand axe have been recovered from the Lower gravels, the Lower Loams contain no evidence of handaxes. Small handaxes are present in the Lower Middle Gravels and more abundant and more 'classic' handaxes are found in the Upper Middle Gravels.
Geographical location and climate – The site is located in a disused chalk pit in the southern Lower Thames basin in north Kent. The gravels in which the 'Clactonian' artefacts were found were laid down in a temperate climate from the faunal and pollen evidence. The Lower Loams represent a stiller slower phase of the river when the environment may have been more marshy.
Stratigraphy – The deposits at Barnfield Pit can be grouped into three depositional phases. The deposits relating to the earliest phase (Lower Gravels and Lower Loams) relate to the initial southern bank infilling of a broad channel river. The Middle Gravels (Upper and Lower) make up the third phase and the Upper Sands, Upper Loams and Upper Gravels make up the third and final phase. The 'Clactonian' artefacts are within the first and lower phase Lower Gravels and Lower Loams.
Archaeology
Excavation – Research at Barnfield Pit began with the discovery of artefacts and bone at the end of the 19th century. It was the work of Smith and Dewy at the beginning of the 20th century that drew attention to the archaeological and palaeontological

potential of the pit (Smith and Dewey 1913). After the discovery of a fragment of human skull in 1935 the investigations at the pit were reinvigorated, although the focus was more on the Middle Gravels. In 1968 however John Waechter began to excavate the Lower Gravel and Lower Loam and continued to investigate the site until 1972 (Waechter, Newcomer, and Conway 1970). Unfortunately Waechter's death in 1977 meant that the full report of his excavations were never published. From 1992 to its publication in 1996 information concerning the site was re-investigated and brought together in a belated excavation report (Conway, McNabb, and Ashton 1996).
Lithics – Traditionally the Barnfield assemblage had been thought to consist of a 'Clactonian' assemblage in the Lower Gravel, sterile Lower Loam, and an 'Acheulian' assemblage in the Lower Middle Gravel. The research undertaken by Waechter and his team demonstrated that the Lower Loam was far from sterile. The Lower Loam knapping floor was particularly interesting with evidence that partially worked cores were brought in and knapped, the cores were then removed. There are possibly two handaxes (including the infamous Black Ovate) found from the Lower Gravels (McNabb 2007) but the rest of the assemblage consists of cores and flakes.
Fauna – Famously the fauna from the Upper Middle Gravels includes three fragments of human skull. The collection of other fauna was affected by excavation techniques and apparently random discard (Schreve 2004). The Lower Loam and Lower Gravel which contain the 'Clactonian' industry contain remains of : (macaque) *Macaca sylvana*; (Mole) *Talpa minor, Talpa cf. europaea*; (Rabbit) *Oryctolagus cuniculus*; (beaver) *Castor fiber*; (vole) *Arvicola cantiana, Microtus oeconomus, Microtus agrestis, Microtus (Terricola) subterraneus*; mice; (bear) *Ursus spelaeus*; (mustelids) *Martes martes*; wolf; (cats) *Panthera leo, Felis sylvestris*; (elephant) *Palaeoxodon antiquus*; (horse) *Equus caballus*; (rhino) *Stephanorhinus (Dicerorhinus hemitoechus, Stephanorhinus (Dicerorhinus) kirchbergensis*; (pig) *Sus scrofa*; (deer) *Cervus elaphus, Dama dama clactoniana*; (bovid) *Bos primigenius, Bison priscus.* Over all the most common species in the Lower Gravel and Lower Loam is the fallow deer, the presence of which would suggest a mixed or deciduous woodland environment. Other faunal remains suggest the presence of more open grazing nearby. The Lower Loam fauna suggest a slightly milder climate, without prolonged ground freezing but similarly with mixed or deciduous woodland with open floodplain grassland.
Interpretation – The traditional interpretation of the site is one of a core and flake 'Clactonian' industry at the base of the sequence in the Lower Gravel with sterile Lower Loam and handaxe 'Acheulean' industry in the Lower and Upper Middle Gravels.

The Waechter excavations demonstrate that the Lower Loam is not sterile and contains a core and flake industry similar to that in the Lower Gravel. Conway *et al.* (1996) conclude that the presence of a handaxe in the Lower Gravel (1 out of 1105 artefacts, as opposed to 3 handaxes out of 151 artefacts for the Lower Middle Gravel) amounts to a quantitative rather than qualitative difference between the Lower Gravel, Lower Loam and Lower Middle Gravel as all other aspects of the assemblages are the same. They suggest that the variation in the presence of handaxes is due to differences in landscape use. However, McNabb (2007) has more recently revised this interpretation slightly saying he placed too much emphasis on the presence of the single biface and that the Lower Gravel and Lower Loam 'Clactonian' industry should be considered as something distinct from the handaxe industry of the Middle Gravels.

SWANSCOMBE - RICKSON'S PIT, Kent (Burchell 1934; Chandler 1932; Dewey 1930, 1932, 1959; McNabb 2007; Ohel 1979; Tester 1985)

Date – The site is presumed to date to MIS 11 on correlation with deposits at Barnfield Pit.

Handaxes – No handaxes are present in the basal gravels at this site although a very few thinning flakes have been observed in Marston's collections at the British Museum (McNabb 2007: 86). Handaxes were recovered from higher units.

Geographical location and climate – The site is located to the east of Swanscombe in a quarry pit.

Stratigraphy – The most detailed stratigraphic interpretation comes from Dewey's observations in the 1930s, more recently summarized by Wymer (1968) and McNabb (2007). The bottom of the sequence is coarse gravel which overlies the chalk. Above the gravel is the shell bed - a sandy layer with concentrations of shells. Overlying this was evenly bedded sand itself overlain by cross-bedded sand and gravel and the whole lot overlain by hill wash (McNabb 2007). The lowest gravel is considered to correspond to the Lower Gravels at Barnfield Pit.

Archaeology

Excavation – The site has been described *inter alia* by Dewey (1930; 1932; 1959), Burchell (1934) and Tester (1985). However it was Louis Leakey who excavated the site in 1934, although the excavations were never published. Leakey's excavations concentrated in the lowest gravels. Marston also collected material from the site.

Lithics – The lithics from the basal gravels are described as Clactonian (Wymer 1968; McNabb 2007). However there is some evidence for collection bias despite the fact the site was excavated (Ohel 1979). The basal gravel assemblage consists of cores and flakes, although McNabb (2007) notes that there are some thinning flakes in the Marston Collections in the British Museum apparently from this level.

Interpretation – The industry from the lowest gravels is considered to be Clactonian (McNabb 2007)

SWANSCOMBE - SOUTHFLEET ROAD, Kent (McNabb 2007; Wenban-Smith *et al*. 2006)

Date – Stratigraphic interpretation seems to suggest the site is contemporary with the Lower Loam at Barnfield Pit, MIS 11.

Handaxes – Handaxes are found in the unit overlying the 'Clactonian' core and flake assemblages.

Geographical location and climate – The site is located just 1km to the southeast of Swanscombe, on the western side of the Ebbsfleet valley, the Ebbsfleet being a southern tributary of the Thames. The faunal remains suggest a wooded environment with some more open, herbaceous areas close to running water (Wenban-Smith *et al*. 2006). The presence of both cold and warm fauna suggests a period early in the Hoxnian interglacial (early MIS 11).

Stratigraphy – Six Pleistocene units were recorded comprising alluvial fan, clayey lacustrine deposits interbedded with coarser slope deposits and final overlain by brickearth (Wenban-Smith *et al*. 2006). Artefacts were found in all units with the possible exception of Unit 1 and were sparse from Unit 2.

Archaeology

Excavation – The site was excavated as part of the archaeological mitigation for the Channel Tunnel Rail Link (CTRL) in south east England in 2004 by Oxford Archaeology under the direction of Francis Wenban-Smith.

Lithics – A small yet significant assemblage has been recovered from this site from three distinct areas/units. The first and perhaps most important is that from the 'elephant butchery site' where a cluster of c. 100 flint artefacts within a 6m by 4m area associated with *Palaeoxodon* bones was recovered. These artefacts were in mint condition and consisted primarily of flakes with some notched flakes and six cores. This area is interpreted as representing *in situ* knapping for the production of large flakes. The second group of 1500-2000 artefacts was found, also in the grey clay (unit 3), to the south of the elephant butchery area. This larger assemblage also contains no sign of hand axe manufacture consisting of large globular cores, unworked flakes and notched flakes. The third assemblage group was found within the bedded gravel (unit 5) that overlay the grey clay. This gravel contained abundant handaxes with over 50 found in sieving and hand excavation and a noticeable lack of associated debitage.

Fauna – The fossils were all recovered from lowermost units 1, 2 and 3. The faunal assemblage contains both cold-loving (e.g. mammoth, *Mammuthus sp.* and ground squirrel, *Spermophilus sp.*) and warm-loving (e.g. rabbit, *Oryctolagus cuniculus*). The clay of unit 3 contained primarily warm adapted animals including the partial elephant skeleton (*P. antiquus*).

Interpretation – The site is interpreted as evidence in support of the argument for a separate *Clactonian* tradition (Wenban-Smith *et al*. 2006) although the research into this important site is ongoing others have suggested it is too early to pass judgment on its Clactonian nature (McNabb 2007).

FRANCE:

ALSACE (Thevenin 1976)

Two pre-late Mindel pebble tools have been found at Achenheim and Hangenbieten.

AZE, Saône-et-Loire (Barriquand *et al*. 2006 ; Combier, Gaillard, and Moncel 2000 ; Moncel, Gaillard, and Combier 2001)

Date – This site has a Lower Palaeolithic industry dated to 350 to 400kya by associated faunal remains (Combier *et al*. 2000). A stalagmitic deposit at the top of the archaeological sequence has been dated to c. 191kya, it is estimated that the deposits immediately underneath this stalagmite relate to MIS 8 (Barriquand *et al*. 2006).

Handaxes – Absent.

Geographical location and climate – The site is a cave in the south of the Bourgogne region, Saône-et-Loire half way between Mâcon and Cluny. Its entrance is in a cliff facing south

Stratigraphy – The deposits within the cave are silty clays. Gravels in a sandy matrix are only known from the northern part of the cave. The deposits appear to be of fluvial origin (Barriquand *et al*. 2006).

Archaeology

Excavation – The site has been excavated and investigated over the past 40 years since it was unblocked and opened up for tourism in the 1960s. Most recently the site and older collections have been researched by Combier *et al.* (2000)
Lithics – The industry is manufactured on local rocks (from the nearby river pebbles and from the cave itself) primarily average quality flint, which is used exclusively for the production of flakes. Chert and crystalline rocks are also used although only flint was deliberately knapped (Moncel, Gaillard, and Combier 2001). The flakes are usually thick with some cortex and those tools in flint are usually intensively retouched. There is little standardization in either the retouch or the knapping and standardized core reduction sequences are absent (Combier *et al*. 2000, Moncel *et al*. 2001). It appears that some of the chert fragments may have been broken from the wall of the cave and used, some fragments were retouched, others simply show use damage (Moncel, Gaillard, and Combier 2001). The cores present were rarely exhausted.
Fauna – The site of Azé cave is particularly important for the fossil fauna and includes horse, rabbit and bovids.
Interpretation - The lithic assemblage seems to suggest that the hominins occupying this site were using the locally available material in an extremely opportunistic way.

BARRY, Saint-Restitut, Rhone Valley (de Lumley 1976a)

Date unknown but choppers and chopping tools have been found.

BAUME BONNE, Quinson, Alpes-de-Haute-Provence (Collins 1969 ; de Lumley 1976c ; Gaillard, Hong, and Moncel 1996; Rolland 1986)

Date – Currently the earliest occupation at this site is estimated to be during MIS 8 (Gaillard, Hong, and Moncel 1996).
Handaxes – Bifaces are present at this site but are rare (75 out of over 80,000 artefacts)
Geographical location and climate – Baume Bonne is a cave and rockshelter site on the right bank of the Verdon River.
Stratigraphy – The site has a complex depositional sequence similar to Caune de l'Arago.
Archaeology
Excavation – Excavations have been undertaken by de Lumley in the shelter and in the adjoining cave.

Lithics – The assemblage has been described as a Tayacian industry characterised by lack of Levallois, rare blades, many scrapers, quina retouch, Tayac points, quinson points, notches, denticulates and becs, proto-limaces and choppers. Bifaces are rare but well made. The lithic industry appears to show a transition from an assemblage with limited Levallois, scrapers and scarce bifaces to one with no bifaces increased quantities of scrapers and more dominant Levallois (Gaillard *et al*. 1996). The artefacts are primarily made in flint/chert which is locally available from the river, however in the lower levels limestone is more common. The bifaces are made on pebbles.
Interpretation – A later Lower Palaeolithic site showing the *in situ* development into a more typical Middle Palaeolithic flake based industry.

BOIS-DE-LA-CHAIZE, Noirmoutier, Armoricano-alta (Monnier 1996 ; Monnier and Molines 1993)
A small Colombanien industry that has been identified at this site off the coast of the southern Armoricain.

BOSSAY, Claisse valley at confluence with the Creuse (Gruet 1976)
A Clactonian industry is reported as having been found here, although a fine biface was identified at a similar level nearby.

CAMARET, Amoricano-Atlantique (Monnier 1996)
Colombanien artefacts reported.

CAUNE DE L'ARAGO, Tautavel, Pyrenees-Orientales (Byrne 2001, 2004; de Lumley and Barsky 2004; de Lumley *et al*. 2004; Falguères *et al*. 2000; Svoboda 1987; Wilson 1988)
Date – Dating has been attempted by AAR, U-series and faunal reference to give date of between 320,000ya and 220,000 for the Tayacian or Acheulean deposits in sols F-G although this has been revised recently to 700,000-400,000BP. More recently faunal analyses of ensembles I, II and III for the middle complex have suggested correlation with MIS 14, 13 and 12 respectively (Byrne 2004). The very lowest levels have not yet been excavated and human activity at the site continues until MIS 3.

Handaxes – Some bifaces are present in some levels, however they never make up more than 1% of the assemblage in each level, usually less than 0.5%.

Geographical location and climate – The site is located in the eastern Pyrenees to the north of the plain of Roussillon, near to the little village of Tautavel, NW of Perpignan. The entrance of the cave opens to the east c. 180m above sea level, overlooking the Tautavel plain and the Verdouble River.

Stratigraphy – The site contains a long complex stratigraphic sequence of over 20 archaeological levels with abundant bone and lithic remains in 15m of deposit. The deposits are divided into four main categories: the lower, middle, upper and terminal complexes. To date the lower complex has only been explored through boreholes. The majority of the archaeological remains come from the middle complex. The middle complex is subdivided into three ensembles: ensemble I, a sandy matrix deposit relating to a cold period that consists of levels S to K; ensemble II, sandy clayey silts deposited during a temperate humid period and consisting of levels J to H; and ensemble III, coarse bedded sands deposited during cold and dry conditions and consisting of levels G to D. The stalagmitic floor separating levels C and D has been dated to >350,000ya by ESR and U/Th (Falguères *et al*. 2000)

Archaeology

Excavation – Arago has been excavated by Henri de Lumley since 1964 over an area of roughly 60 sq metres. Excavation is ongoing.

Lithics – Over 140,000 artefacts have been recovered from the site and it has been assigned to the Tayacian and middle Acheulean traditions. The 'Tayacian' is mainly on quartz, rarely on flint and exceptionally on quartzite. There is no Levallois, low blade index and low flaking index. Scrapers, notches, Tayac points, scalariform retouch, protolimace, quinson points etc make it similar to Baume Bonne and La Micoque. Pebble tools are very numerous and bifaces very rare (less than 1 per 1000 retouch tools) micro choppers and micro chopping tools have suggested similarities with Vértesszőlős.

The lithics are on a diverse range of raw materials from both local sources and further afield, from up to 35km (Wilson 1988).

Fauna – The abundant fauna includes over 100 fragments of human remains.

Interpretation – The recent re-dating has led to some suggestion that the initial levels of the site represent the pre-Acheulean occupation of Europe.

CHARENTE

Generally this area has rare Acheulean sites that lack bifaces and whose industries appear to show unique traits of methods of production.

CHILHAC, Haute-Loire (Delporte 1976)

Dated ambitiously at 1.8mya but the stratigraphy is unclear. A number of flaked quartz pebble artefacts have been found but are not beyond doubt.

COUDOULOUS 1, Vallée de Garonne, Lot (Bonifay and Clottes 1979; Brochier 1976; Jaubert and Mourre 1996; Jaubert and Servelle 1996)

Date – The main palaeontological level is bed 7 dated through U/Th and fauna to "Mindel Riss" MIS 9-11 (c.330-400ka).

Handaxes – Classic bifaces are absent.

Geographical location and climate – This is a karstic cave site situated on the edge of a plateau at the confluence of the Lot and the Cele, altitude 270m.

Archaeology

Excavation – It was excavated as a salvage excavation following the partial destruction of a large area of the fill of the cave.

Lithics – The stone industry from the lower levels is poor but consists of pebble tools on local material and bifaces *sensu stricto* are absent.

Interpretation – Jaubert and Servelle attribute thlack of classic bifaces to the poor quality of the raw material and the type of site, it appears to have been associated with the exploitation of large fauna. Similarities have been highlighted with Grotte Vaufrey.

CURSON, between Romans and Tain, Drome (Jaubert and Servelle 1996)

The site was discovered in the nineteenth century with faunal remains and associated stone flakes. Handaxes are absent but there are only c. 50 flakes of limestone, shale, quartzite and flint. Retouch is rare and flakes rough. It has been compared to Grotte-de-l'Observatoire in Monaco.

DADOU TERRACES, Tarn (Brochier 1976; Jaubert and Servelle 1996)

The middle terrace of the Dadou has an archaic pebble tool industry on quartz and quartzite. Jaubert and Servelle assign this to the *Acheulean sensu lato* (1996).

GROIX, Island in Morbihan, Brittany (Gamble 1999; Molines 2005)

This island has yielded a number of worked pebbles.

GROTTE VAUFREY (de Lumley 1976b)

Principally a faunal site there are some stone tools reported but no bifaces.

LA GROTTE D'ALDENE (de Lumley 1976b)

Dated at Mindel-Riss the site is located in a cave mouth on the left bank of the River Cesse. There is a lack of bifaces, and a flake industry with scrapers, notches etc. This site is attributed to Tayacian, and is considered similar to that at Arago.

LA GROTTE DU MAS DES CAVES A LUNEL-VIEL, near Montpellier (Chauvet and Riviere 1896; Falgueres, Bahain, and Saleki 1997; Guichard 1976; Rolland 1986)

Dated to Mindel-Riss or Riss the site has a homogenous pebble tool industry with choppers and chopping tools, scrapers, denticulates, large 'bifacoids', proto Levallois and also some bone tools. This assemblage has been described as Tayacian and has been compared to Caune de l'Arago. It has also been interpreted as possibly archaic Acheulean.

LA MICOQUE, Near Sarlat, Dordogne (Anonymous 1987; Bordes 1969, 1984; Bosinski 1970; Chauvet and Riviere 1896; Debénath and Rigaud 1987/8, 1991; Falgueres, Bahain, and Saleki 199; Guichard 1976; Laville 1974; Laville, Rigaud, and Texier 1986; Patte 1971; Peyrony 1931a, b, 1938; Rigaud 1991; Rolland 1986; Texier and Bertran 1993; Villa 1991)

Date – Levels 2/3 have been dated to 287kya+/- 11ky, by ESR (Falgueres, Bahain, and Saleki 1997). However, recent U-series and ESR dates suggest the the lower levels may be older than 300.000BP (Monnier 1996, Scuvee and Alduc 1981)

Handaxes – Hand axes are present in some of the upper layers but not the lower three.

Geographical location and climate - A rock shelter site in the Perigord area of France.

Stratigraphy – Confusingly there are two stratigraphic systems used at La Micoque. Bed H is notable for its lack of bifaces and the presence of a large number of diverse scrapers and has been described as Tayacian or Tayacian-Mousterian. Level E, C, and A in beds 3, 2, and 1 have been described as Clactonian or Tayacian and dated to Riss I or possibly ante-Rissian. From bed 1 only 14 items have been found; from bed 2 509; and from bed 3 (subdivided into 3a and 3b) 3a (Clactonian according to Breuil, proto-Mousterian according to others) has low biface and Levallois index and some UP types; 3b has 3 bifaces and is seen as Tayacian.

The presence of the non-handaxe industry was first noted at this site by Peyrony in 1938. Interpretations have varied (see table below)

Arch. layer	(Breuil 1932)	(Peyrony 1938)	(Bourgon 1957)	(Bordes 1969)	(Bosinski 1970)	Rolland (1986)	(Geneste 1990)
6	Micoquian	Micoquian	Micoquian	Micoquian	Micoquian	Micoquian	Micoquian
5	Tayacian	Tayacian	Acheulian	Acheulean meridional’	Micoquian	Acheulean	Acheulean meridional
4	Tayacian	Mousterian	Pre-Mousterian	Pre-Mousterian	Micoquian	Tayacian/Pro to Levallois	Middle Palaeolithic
3	Clactonian	Tayacian	Pre-Mousterian	Pre-Mousterian	Micoquian	Tayacian	Middle Palaeolithic
2	Clactonian	Tayacian	Tayacian	Non-determined	Micoquian	Clacto-Abbevillian	Non-determined
1	Clactonian	Non-determined	Non-determined	Clactonian Acheulian or Clactonian	Micoquian	Non-determined	Non-determined

(Falgueres, Bahain, and Saleki 1997)

LANDEMER, Contentin (de Lumley 1976a)

Chopper tools assemblage.

LA PETITE CRAU/CRAU DE SAINT-REMY, Alpilles (Delporte 1976)

Date – Dating is uncertain but it was claimed as Gunz and Mindel.

Handaxes – Absent.

Geographical position and climate – An ancient alluvial bed attributed to the lower Pleistocene, Gunz.

Stratigraphy – Surface collection.

Archaeology

Excavation – Collected

Lithics – Quartzite pebbles have been worked and found on the surface, again there seem to be two age-base series (from patina): one, Gunz date, of pebble tools; second, Mindel date, also pebble tools.

Fauna – Absent

Interpretation – The small number of tools and surface collection makes it difficult to date and interpret the significance of these finds.

LE PIE DU ROI, Cerzat, Haute-Loire (Geneste and Plisson 1996; Rigaud and Texier 1981; Rolland 1986)

A group of flaked pebbles has been found similar to the others in the area, believed to be Lower Palaeolithic.

LES TARRES, Perigord (Delpech *et al*. 1995; Geneste and Plisson 1996; Giot, Monnier, and L'Helgouac'h 1998; Hallégouet and Molines 2001; Molines 2005, 2005?; Molines, Hinguant, and Monnier 2001; Monnier 1991, 1996; Monnier and Molines 1993)

Date – Dating of the site is difficult although it is estimated to be older than 300ka (Delpech *et al*. 1995).

Handaxes – There are no bifaces at the site and no Levallois technique.

Geographical location and climate - This is an open air site located on the Isle River in the Perigord area of south western France.

Archaeology

Excavation - It was discovered in 1981 by agricultural workers and was completely excavated in 1991 in a rescue excavation directed by J. M. Geneste and J. P. Texier with support from the CNRS. Artefacts were collected during the excavations over an area of c.40 m^2.The artefacts were found in one homogenous layer around 20cm thick.

Lithics - Around 6000 stone artefacts were discovered along with many animal bones. The tools were mainly flakes and simple flake tools, the majority (82%) in flint. The retouched tools made up 17% of the total lithic assemblage. The flint was locally procured from less than 1 km from the site or from the alluvial deposits at the site where pebbles of flint and other raw material were available (Geneste and Plisson 1996). Quartz and quartzite pebbles were used to produce pebble tools. All the retouched tools were made from flint.

Fauna – The faunal assemblage primarily consists of large herbivores such as horse, bovid and deer.

Interpretation - Geneste and Plisson have likened the debitage to that at High Lodge on the basis of the retouched tools. For these authors the site is Mousterian, of the Quina tradition and represents a butchery location.

MENEZ DREGAN, Plouhinec, Finistère, Amoricano-Atlantique (Hallégouet and Molines 2001; Molines 2005, 2005?; Molines *et al*. 2003; Monnier *et al*. 2001; Monnier *et al*. 1994; Monnier *et al*. 2005; Monnier 1996; Monnier and Molines 1993; Scuvee and Alduc 1981; Van Vliet-Lanoe, Hallégouet, and Monnier 1997)

Date – The industry is dated to between MIS 13 and MIS 9 (Monnier *et al*. 2001, Monnier *et al*. 2005)

Handaxes – None are reported but some artefacts that could be described as non-classic bifaces are present. There are no bifaces from the lower levels but at least one is present in level 4 (personal observation), although the excavators describe it as a 'bifacial chopper'.

Geographical location and climate - The site is located to the south of Cape Sizun in the west of Brittany. A succession of marine erosion passages and collapsed caves were occupied by hominins making Colombanien artefacts in between marine ingressions.

Archaeology

Excavation - Unlike Saint Colomban which was excavated in difficult inter-tidal conditions here the evidence for habitation is clearer and evidence for hearths has been found in the upper levels (Monnier *et al*. 2005). A rescue excavation, following the excavation of test pits in 1989, was begun in 1991 and excavations at the site are ongoing.

Lithics - The main material used is flint but quartz, quartzite, granite, limestone and sandstone artefacts are also present. The artefacts are made on locally available marine pebbles.

Bones – Bone preservation is poor, those present are very fragmented and difficult to identify.

Interpretation – The industry is described as Colombanien.

MONTFARVILLE-LANDEMER, Contentin (de Lumley 1976a)

Flake and core tools.

MOYENNE VALLEE DE LA DURANCE, between the Mees and Oraison, Provence (Moncel 1996, Moncel, Moigne, and Combier 2005)

Eight terrace levels are present at this site dating from Pre-Gunz to Wurm. Archaic pebble tools have been found dated to the beginning of the Wurm.

NORD PAS DE CALAIS

A number of single finds have been made of possibly early Middle Pleistocene date but a single polyhedroid and a single flake are not sufficient to demonstrate the presence of human in this area at this time.

ORGNAC 3, Ardeche (Collins 1969; Guichard 1976; Moncel 1996; Moncel, Moigne, and Combier 2005; Rolland 1986)

Date – from c. MIS 9

Handaxes – Very few

Geographical location and climate - This is a karstic cave site in the Rhone Valley not far from the gorges of the Ardeche. In later periods of occupation the site changed from a cave to a rockshelter site and during the final stages of occupation it was an open air site.

Stratigraphy – 10 archaeological levels have been observed in 4m of deposit and dates by ESR and UR-TH for the stalagmitic deposits at the base of level 6 have given dates of c. 350kya (MIS 9) and of 280-300,000BP for level 2 from volcanic ash.

Archaeology

Excavation – The site was excavated between 1959 and 1973 by J. Combier

Lithics - Over 1984 lithic artefacts have been recovered. The frequency of tools increases with the levels, the number of pointed tools and scrapers increases through time, while the number of notches, denticulates and endscrapers stays the same as do the choppers, although handaxes (only present in small numbers) decrease from the base of the site to the top.

Interpretation – Moncel *et al*. argue that the behaviour displayed by hominins occupying the site did not change through time despite changes in technology and in the length of occupation (2005).

PECHE DE L'AZE II, Carsac (Bordes 1972; Bordes and Bourgon 1951; Grün, Mellars, and Laville 1991; McPherron, Soressi, and Dibble 2001; Monnier 1996; Rolland 1986; Schwarcz and Blackwell 1983; Villa 1983)

Date – The lower levels of Peche de l'Aze II are belived to ate to MIS 6 (Grün, Mellars, and Laville 1991, Schwarcz and Blackwell 1983)

Handaxes – Bifaces are reported as present but are atypical (see Villa 1983:190 figure 41). They are manufactured on a variety of raw material nodules (basalt, quartz, lava) although flint is preferred. Only one, on flint, is manufactured on a flake blank (Villa 1983)

Geographical position and climate – Peche de l'Aze consists of four cave and rockshelter sites (Peche de l'Aze I to IV) in a small valley associated with a small tributary of the Dordogne River. Peche de l'Aze II is the Lower Palaeolithic location and is located at the north western end of a tunnel-like cave of which Peche de l'Aze I is at the other, south eastern end.

Stratigraphy – Bordes excavations identified a sequence of cryoclastic, clayey/sandy deposits with erosional and weathering horizons. At the bottom of the sequence at Peche de l'Aze II Bordes identified the Meridional Acheulean. The lower levels 5 to 9 are believed to date to MIS 6, there is then a break before layers 2 to 4 which date from between mid MIS 5 to MIS 3. The strategrahic sequence is over 3m thick and the archaeological horizons are present both within and outside the cave.

Archaeology

Excavation – Peche de l'Aze II was discovered by Bordes in 1948 and he excavated there between 1949 and 1951 and a second time between 1967 and 1969 (Bordes 1972, Bordes and Bourgon 1951).

Interpretation - Beds 8,7 and 6 have been described as proto Mousterian like bed 4 in La Micoque, then later as Clactonian like bed 3 at Micoque (by Bordes). This later changed again to Meridional Acheulean in the 1960s. These beds have very little Levallois, Upper Palaeolithic tools are present throughout, bifaces do exist but there are few.

PENESTIN, Amoricano-Atlantique (Monnier 1996)

Colombanien findspot.

PLESTIN-LES-GREVES, Amoricano-Atlantique (Monnier 1996)

Colombanien findspot.

PLOUHARNEL, Amoricano-Atlantique (Bourdier 1976 ; Tuffreau 1976b)

Flake tools.

POINTE-AUX-OIES, Wimereux, Haute Artois, Northern France (Giot, Monnier, and L'Helgouac'h 1998; Molines, Hinguant, and Monnier 2001; Monnier *et al*. 1994; Monnier 1991, 1996; Monnier and Le Cloirec 1985; Monnier and Molines 1993; White 2000)

Date – Pre-Mindel

Handaxes – Absent

Geographical location and climate – The site was exposed by marine erosion in gravel in cliff.

Stratigraphy – The industry is believed to be associated with the lower gravel which is linked to gravel at Wissant which contains *Elephas prmigenus* and *Hippopotamus major* fossils indicating a pre-Mindel age.

Archaeology

Lithics – The industry is worked on flint pebbles and is very varied with uni, bi and multifacial working, alternate bifacial flaking is rare. Flakes are rare at this site, although those that are found often have cortex or are 'orange slice' pieces , typical of pebble industries.

POINTE DE ST-COLOMBAN, Brittany (Molines 1996, 2005; Monnier *et al*. 1994; Monnier 1996; Monnier and Le Cloirec 1985; Monnier and Molines 1993; Scuvee and Alduc 1981; Van Vliet-Lanoe, Hallégouet, and Monnier 1997)

Date – Uncertain but from comparison with other sites in the area the excavator, J.-L. Monnier believes the site to be Lower Palaeolithic, Middle Pleistocene.

Handaxes – Handaxes are absent from the main site at St Colomban but at the other side of the St. Colomban bay, less than 1 km away a handaxe was collected. Although collected in isolation this may have come from the same or contemporary deposits as the main St. Colomban site.

Geographical location and climate – This site is a collapsed marine notch at the base of a cliff on the Saint-Colomban Peninsula in Morbihan, Brittany.

Stratigraphy – The lithic industry was found in three distinct beds (3, 4 and 6) on a beach deposit made up of large pebbles. The deposits relate to an interglacial period but there is evidence for two marine transgressions and two periglacial cycles in the deposits at Saint Colomban.

Archaeology

Excavation – After a number of preliminary investigations a salvage excavation was undertaken in 1981 and 1982 following storm damage.

Lithics – Over 500 tools were found and were manufactured on flint, sandstone, quartz and quartzite. Tools have been sorted into two series: one recent and one ancient. The recent series includes Levallois flakes but does not contain enough artefacts for a good analysis; it is interpreted as at least middle Palaeolithic and possibly as including some epi-palaeolithic elements. The ancient series is generally very rolled and characterised by a low Levallois index and low blade index. The flakes are very small with few removals on the dorsal. The scrapers are numerous but poor, Upper Palaeolithic types are rare and the flake tools are dominated by notches, and denticulates – often made up of Clactonian notches. There are no bifaces but pebble tools are abundant.

Fauna – None

Interpretation – Comparisons have been drawn with both the Tayacian and the Clactonian but is now interpreted as Colombanien.

SAINT PAUL CAP DE JOUX (En Rouget), Tarn Basin (Delporte 1976)

This findspot is located on a high terrace on the right bank of the Agout River, to the north of Saint Paul Cap de Joux and Le Rivalou by a bed of very large pebbles. A number of artefacts have been found including bifaces believed to be of ancient Riss age.

SINZELLES, Polignac, Haute-Loire (Delporte 1976)

Unfortunately only bones have been found at this site but they have been reported to have cut marks. The fauna suggests a date of around 1mya.

SOLIHAC, Blanzac, Haute-Loire (Gamble 1999; Thibault 1976)

This site is dated to 0.8mya with excellent stratigraphic conditions and artefacts in basalt, flint and quartz. The artefacts are largely pebble tools and are associated with an excellent faunal assemblage.

SOUTHWEST FRANCE

There is a general lack of classic bifaces in this area (although there is also a lack of Lower Palaeolithic material in general). The Chalosse area has yielded examples of partial bifaces and 'primitive' trihedral picks, leading some to use the term Chalossian Acheulean but the use of quartzite pebbles as raw material may explain this (Thibault 1976). There are a few instances of pebble and flake tools being recovered from gravel deposits and surface finds but dating is problematic (de Lumley 1976b).

STATIONS DE CIPRES and 2, near to Frenillot (de Lumley 1976b)

'Evenosian' artefacts have been reported to have been found at this surface locality, like those at Frenillot.

STATIONS DE GRAND MUSCAT and POUDEROUSES, Libron Basin (de Lumley 1976b)

Located on gravel beds in the libron basin, the industry from these unstratified, open-air find spots is non Levallois, often on natural flakes, with few scrapers, a large number of Clactonian notches, denticulates with several Clactonian notches and becs. The date is unknown.

STATION DE FRENILLOT, E. of Montpellier (de Lumley 1976a)

Located on a terrace of the Rhone that dates to the Lower Pleistocene, the industry from this locality is described as Evenosian and is generally in flint. It is a flake tool industry without Levallois, with 'average scrapers, badly made', no points, a large numbers of Clactonian notches, becs, polyhedroids, chopping tools with large removals and an average Upper Palaeolithic type index.

STATION DE LA FERME DU VALLON, Entressen, La Crau - between Alpillles and Berre; STATION DE LA SAMATANE, Saint-Martin de Crau, La Crau; STATION DE TERME-EST, Salon-de-Provence, La Crau; STATION DES COUSTIERES DE MALACERIS, Mouries, La Crau; STATION DU CASTEL, Salon-de-Provence, La Crau (de Lumley 1976a)

The above are all within La Crau and have produced archaic pebble tool industries of reported Gunz and Mindel date.

STATION DE LA PLAINE DE LAURE, Plateau de Riez - Valensole, Provence? (de Lumley 1976d)

Many Palaeolithic tools have been found here on the surface of an ancient soil. They apparently relate to two distinct series distinguished by patina: one with quartzite tools which include discoid, globulous core and a flake; the second with quartzite and shale tools which seems to be closer to the 'Evenosian'.

STATION SOUS MARINE, Le Havre littoral (de Lumley 1976c ; Ohel and Lechavallier 1979)

This site is located on the northern side of the mouth of the Seine at Le Havre, on the foreshore. It is mostly buried by beach deposits. It was the Abbé Breuil who identified the sites as Clactonian in 1930s, an identification that was challenged at the time but Breuil's influence prevailed, although it has since shown that a few rough out handaxes are present at these locations (Ohel and Lechevallier 1979).

STATION ROMAIN, Le Havre Littoral (Monnier 1996; Ohel 1979; Tuffreau 1976)

As Station Sous Marine above, although this site contains handaxes.

STATIONS DE PUIMOISSON,Plateau de Riez-Valensole (de Lumley 1976a; Villa 1983)

Similar to other sites in the area, found on an ancient soil surface. It lacks Levallois, is characterised by few scrapers, fairly strong UP component, remarkable number of Clactonian notches, denticulates and becs and chopping tools and polyhedroids. The date is unknown.

TERRA AMATA, Nice (Villa 1983, 1991)

Date – Dated to 230kya +/- 40ky, TL on flint, Oxford Lab (Villa 1983) but ESR on quartz from same deposit suggests 380kya+/- 80ky (de Lumley 1976).

Handaxes – The assemblage does contain handaxes, although in small numbers (c.1%).

Geographical location and climate – The site is located at the eastern edge of Nice on the western slope of Mont Boron at 26m above sea level. It is more or less an in situ archaeological deposit within dune/beach context. The site was located on the sea shore close to the Paillon River delta which has since moved westwards.

Stratigraphy – A number of occupation horizons have been identified indicating long term use and reuse of the site. The archaeological material is oncorporated into deposits associated with the third marine cycle of a threefold series of littoral marine deposits each covered by loess-like silts with a weathering horizon (Villa 1983). The third beach sequence is covered by dune deposits and loess-like silts, and thi is covered by a thick fossil soil and finally overlain by colluvial clays. The archaeological deposits are c. 1.5-2m thick in total (Villa 1983). Analysis of the distribution of the artifacts seems to indicate that the site represents a more or less contiuous occupation as no clear occupation surfaces could be demonstrated. Villa distinguishes between 3 levels: Dune, Beach and Lower Cycle for the purpose of her analysis, however she acknowledges that there are some refts between these layers and it is a crude form of differentiation (Villa 1983).

Archaeology

Excavation – The site was subject to rescue exavations in one short season between January and July 1966 by Henri de Lumley following the disturbance and discovery of the site during building works (Villa 1983). An area of around 130 sq metres was excavated and there is excellent preservation of organic material, including hearths and postholes (Villa 1983).

Lithics – It is primarily a pebble tool industry using local beach pebbles. 4123 artefacts were recovered from the Dune deposits, of which 81% were waste pieces (including cores and unretouched flakes), 9% modified or utilized pieces and 10% shaped tools. The Beach deposits yielded 3676 artefacts of which 62% were waste pieces, 25% modified or utilized pieces and 13% shaped tools. From the Lower Cycle deposits 3094 artefacts were recovered, of which 77% were waste pieces, 11% modified or utilized pieces and 12% shaped tools. The artefacts were made on flint, silicified limestone and fine grained limestone with the choppers made primarily on fine grained limestone, with very few (c.8%) on silicified limestone. Silicified limestone and flint pebbles were teh most common materials for small toosl and cores (Villa 1983).

Fauna – The fauna is not abundant but included: *Paleoloxodon antiquus, Cervus elaphus, Sus scrofa, Bos primigenius, Hemitragus sp., Oryctolagus cuniculus* and caprids. Elephant, deer, rabbit and boar are the most common. Burned shell fragments were also recovered from the Dune

Interpretation – In certain area concentrations of large limestone bloacks were found surrounding areas of artefacts concentration, these were interpreted as indicative of some kind of dwelling (Villa 1983). Villa considers Terra Amata within the broader context of European Middle Pleistocene industries as part of the Older Acheulean group including Arago and Peche de l'Aze II (Villa 1983).

TERRASSES DU FRESQUEL, from Castelnaudary to Carcassonne (de Lumley 1976b; de Lumley *et al*. 1976)

A tributary of the Aude that runs from west to east has yielded a number of artefacts from its terraces. The majority of these are pebble tools, mainly choppers.

TERRACES OF ROUSSILLON (Monnier and Molines 1993)

There are numerous sites on these terraces with archaic pebble tool industries and 'bifacoides' or crude bifaces dated to the Gunz period.

TOULINET, Plestin-les-Greves, N. Brittany (de Lumley 1976a)

A possible Colombanien habitation site.

VALLÉE DE LA BLEONE, Provence (Bernal and Moncel 2004; de Lumley 1976a; Roebroeks and van Kolfschoten 1995; White 2000)
Many alluvial terraces are known from this valley dating from Gunz to Wurm. A single convex scraper in quartz was recovered from Mindel deposits.

VALLONET, Roquebrune-Cap-Martin, Maritime Alps (Gruet 1976)
This cave site in the Maritime Alps is reported as being of Gunz date, magnetic reversal is positive and strong – taken to be Jarmillo event - the archaeology is associated with fauna that gives dates of between 1.3 and 0.7mya. The assemblage consists of a pebble tool industry with pebble tools, flake tools and possible worked bone.

VILLE-FRANCHE-SUR-CHER, Loire valley (Mania 1991, 1995; Molines 1999)
A further 'Clactonian' industry is reported at a similar height to the previously mentioned Bossay, although again bifaces have been found nearby. These two sites and diversity of assemblages in this area have been related tentatively to the raw material variation.

GERMANY:

BAD CANNSTATT, see CANNSTATT

BILZINGSLEBEN, Steinrinne (Brühl 2003; Hertler 2006; Mania 1991; Mania and Mania 2003; Mania and Weber 1986; Meyrick and Schreve 2002; Molines 1999; Schwarcz *et al*. 1988; Svoboda 1987)
Date – The layer containing the industry is dated to the Holsteinien. Uraniun series dating places the finds level (Bilzingsleben II) at >350kya while ESR dating places it at between 320 and 412kya (Mania and Mania 2003, Schwarcz *et al*. 1988).
Handaxes – Classic handaxes in stone are absent but there are handaxes in bone and small 'handaxe-like points'.
Geographical location and climate – The site is located in the southwest of the Steinrinne complex on an ancient terrace around 30m above the bottom of the valley

on the northern edge of the Thuringian Basin. In this valley embedded travertines formed after the Elster glaciations.

The floral and faunal evidence suggests that Bilzingsleben II does not correspond to the Holstein *sensu stricto* (Mania and Mania 2003). The landscape was moderately wooded with light, dry, mixed woodland and shrub alternating with steppe meadows.

Stratigraphy – The stratigraphic sequence observed consists of fluvial gravels under a travertine flow with temperate fauna. There are six terrace-travertine sequences (Bilzingsleben I-VI) each of which is estimated to represent c. 80-100kyr. The Holstein complex (Bilzingselben I-III) contains three of these cycles between the Elster and the Saale glaciations. The archaeological finds come from the second Horizon (Bilzingsleben II)

Archaeology

Excavation – In 1969 D. Mania discovered the Lower Palaeolithic site at the base of Middle Pleistocene travertine. From then onwards the site has been subject to research excavations by the Landesmuseum für Vorgeschichte Halle and since 1992 by the Friedrich Schiller Univeristät of Jena.

Lithics – The industry is mostly manufactured in flint (75%) (Mania and Mania 2003) and is characterised by small artefacts (between 8 and 100mm with most between 18 and 35mm) although there is a macro tools element. Roughly 140,000 artefacts have been recovered from Bilzingsleben, 75% made of flint, of these artefcts in flint around 30,000 have been modified.

The percentage of flint cores from the different areas varies between 2% and 6%, Brühl suggests that the percentage of core-like artefacts is much greater at around 30% (2003). The majority (57%) of the flint cores are in the final stages of reduction. They are small, ranging between 13 and 54mm, the majority falling between 26 and 30mm long. Half of these flint cores have preparpation of the striking platform, Levallois like cores are present although the majority (55%) of the cores are unidirectional, 14% are bifacially worked, 6% unifacial, 5% have two striking platforms and one reduced surface and 5% were alternatively flaked (Brühl 2003).

Between 55 and 65% of the flint artefacts are unmodified flakes which range between 70 and 7mm in length although most (80%) are less than 21mm in length. These flakes vary in shape. Only 15% of the flakes have a prepared platform and 85% have platforms that are either cortical or fractured. For the majority of flakes more than half the dorsal surface had been flaked, and for a quarter of the flakes over 90% of the dorsal surface had been flaked, the majority of the flakes are from advanced stages in core reduction. Despite the fact that alternate flaking is found in only 5% of the cores c. 50% of the flakes seem to have come from this method of flaking. Those flakes that were selected for further modification tend to be longer than the unmodified ones (Brühl 2003).

The tools, or retouched pieces, make up roughly 15% of the flint assemblage and 30% of these are made on flakes, 45% on debitage and 25% on natural fragments. The tools are divided into small, less than 35mm, and large, greater than 35mm (up to 130mm). There are a number of points, including 'handaxe-like points' 30-60mm long (Brühl 2003), denticulates, notches, tayac points and scrapers. Borers are also common.

Alongside the small tools on flint there is a pebble tool element on limestone, travertine, quartz, quartzite and other crystalline rocks. The choppers represent 24% of the macro tools and the chopping tools 3%. The large tools are described as 'cutting tools' (Mania and Mania 2003) and include backed knives, and bifacially retouched knives.

There are also a number of bone tools which include handaxes and evidence for wooden artefacts including possible spears. A number of the bone artefacts show possible signs of engraving.

It is considered tha raw material size cannot explaing the predominance of small tools at Bilzingsleben as flint nodules are available in the area up to 1000mm diameter (Brühl 2003).

Fauna – The fauna include human remains: 27 cranial fragments, a right mandible and 8 teeth (Mania and Mania 2003). Within the archaeological level, Bilzingsleben II a rich faunal assemblage has been found: *Palaeoloxodon antiquus, Dicerprhinus kirchbergensis, D. hemitoechus, Bison priscus, Cervus elaphus, Dama clactoniana, Capreolus suessenborensis, Equus mosbchensis-taubachensis, Sus scrofa, Ursus deningeri-spelaeus, Panthera (Leo) spelaea, Felis sylvestris, Canis lupus, Vulpes vulpes, Meles meles, Martes sp., Macaca florentina, Castor fiber, Trongotherium cuvieri, Allocricetus bursae, Lagurus lagurus, Glis glis* and *Arvicola cantianus.*

Interpretation – The site is considered to represent several occupations by hominins on the shore of a small lake. Mania describes the site as a campsite and considers the deposits to be more or less in primary position (e.g. Mania 1991, 1995, Mania and Mania 2003). The excavators have reported the presence of a number of zones, considered to be indicative of different activities. Mania has also reported evidence for habitation structures in the form of large circular enclosures of stones.

Brühl considers the microlithic element at Bilzingsleben to be the result of a combination of cultural and functional factors (Brühl 2003)

CANNSTATT, Stuttgart, Neckar Valley (White 2000)

Geographical location and climate – Three quarry sites have been excavated from the Neckar Valley area.

Stratigraphy – The Haas quarry has yielded 1800 artefacts in flint from the Upper Lehm horizon. The Lauster quarry site has faunal remains associated with choppers and the final site consists of lithics associated with unworked pebbles from the upper Lehm horizon.

Archaeology

Lithics – The Haas industry consists of some pebble tools – choppers and micro-chopper scrapers and jet stones. Flint debris makes up the rest of the assemblage. The Lauster site has yielded faunal remains associated with choppers. The lithics of the final site consist of pebble tools associated with un-worked pebbles.

Interpretation – The Haas site is interpreted as a living area of around 15m diameter. The Lauster quarry site is interpreted as a hunting camp rather than a permanent rockshelter, and the final site is interpreted as a 'collection point' or a living site.

KÄRLICH (Molines 1999)

Date – The age is considered to be c. 500ka

Handaxes – Present in some layers.

Stratigraphy – A pebble tool was discovered at Kärlich A in a loessic sandy layer below the Matuyama/Bruhnes limit. In the Bb level a few more artefacts were discovered: cores, flakes, pebble tools all in quartzite. Worked pebbles are also found in section H where the artefacts are simple: flakes, three bifaces, chopping tools and some cores – this section belongs to the third cold period.

Interpretation – Generally the assemblage is too small to interpret

KÖCHSTEDT, Eisleben district (Mania 1995)

Date – Early Saale or before – probably contemporary with Bilzingsleben

Handaxes – Absent.

Geographical location and climate – Located in the Salzke Valley in the eastern Harz foreland where Middle Pleistocene gravels are exposed. The upper part accumulated during a cold phase interpreted as the early Saale.

Stratigraphy – deposit consists of two fluvial series as in the Geisel valley. The upper gravel part accumulating during a cold phase and the lower sandy gravel belonging to the *Corbicula* horizon.

Archaeology

Excavation – exposed.

Lithics – There is a small series of artefacts consisting of flint flakes similar to those from Wangen, Membleben and Wallendorf.

Fauna – The fauna includes interglacial aquatic species. *Palaeoloxodon antiquus, Dicerorhinus kirchbergensis, Castor fier and Esox lucius* are also found.

Interpretation - The assemblage is possibly too small to interpret.

SACHENSBERG, Arten District (Mania 1995)

Date – c. 320-412kya

Handaxes – Absent

Geographical location and climate – On the western edge of the Wipper-Unstrut valley gravels.

Archaeology

Excavation – The gravels were exposed in the 1970s and a small assemblage of flint artefacts was discovered.

Lithics – The artefacts include a crude polyhedric core and some small flakes with obtuse flaking angles.

Fauna – Interglacial molluscan fauna and *Palaeoloxodon antiquus.*

Interpretation – related to the Bilzingsleben assemblage.

SCHÖNINGEN, Helmstedt district, Lower Saxony (Burdukiewicz and Ronen 2003; Mania 1995; Thieme 2003, 2005)

Date – from the Holsteinian onwards. The oldest part of the site, Schöningen 13 I is from the earliest part of the Holsteinian complex. Schöningen 12 dates to the subsequent Reinsdorf Interglacial, as does the Schöningen 13 II-4 site

Handaxes – Absent

Geological location and climate – Located on the northern region of the sub-herzynic basin north of the Harz mountains, in a NW-SE channel following the southern basin of the Straßfurt-Helmstedt salt saddle. The channel was changed into a shallow swampy lake with an eight meter sequence of deposits.

Stratigraphy – The 8m deep sequence of lake deposits consists of five series with limnic sediments at the base which change into lowlying peats and swampy soils. The oldest Pleistocene deposits so far are Elster Glaciation deposits, above these are a series of six major erosional channels representing a series of interglacial/glacial cycles entitled Schöningen

Archaeology

Excavation – The site has been excavated by D. Mania and his team over many years at the Schöningen brown coal mine c. 100km east of Hannover.

Lithics – the lithics are manufactured on baltic flint and are said to resemble those from Bilzingsleben. A full sequence of artefacts has been found as well as some small hammerstones. Denticulates and notches are the main tool types but heavy duty tools and finer retouched points are also present. Wooden artefacts, most famously the spears, have also been found. There is also evidence for fire at the site with fragments of burn wood. While handaxes are absent the site has been closely technologically and typologically linked to Bilzingsleben and Bifacially shaped points which if found in a larger size would not be out of place being called handacxes, have been found.

Fauna –

Interpretation – The excavators maintain that this sie is associated with horse hunting activities evidenced by the presence f the spears and horse bones with extensive cutmarks. Furthermore it is considered that the small artefacts may have eben inserted into grooved wooden artefacts resulting in composite tools (see Burdukiewicz and Ronen 2003 page 238 for a possible reconstruction).

MIS	**Glaciall/ intergl.**		**Schoningen channel**	**Schoningen site**			
MISI	Holocene		Sch VI				

	Eemian		Sch V				
	Saale						
	Drenthe		Sch IV				
	Dömintz		Sch III				
	Fuhne Cold	Ice structure s	Sch II level 5				
			Sch II level 4				
	Reinsdorf IG	Boreal cool-temperate climate, meadow and	Sch II, level 4	Sch. 13 II-4	Discovered 1994 in organic mud. Some evidence of burnt sediment suggestive of fire.	>25,000 faunal remains; horse (>90%) (*Equus mosbachensis*), butchery evidence	Flint assemblage: scrapers, points & c.1200 chips from retouch. Blank production waste absent. Wooden tools (spruce): throwing stick, c.6 spears (incl. 1 pine),& other wooden artefacts incl. forked branch with charred ends – pos. a spit.
			Sch II, level 2	Sch.1 2 find layer 2	2-3m higher than Schoningen 12. 30m² excavated .	large mammals	some flint artefacts
		Early and interglacial maximum of Reinsdorf with	Sch II, level 1	Sch. 12	Discovered 1992. 150 m² excavated in 3 months. Lakeshore deposits. Correlated w/ Bilzingsleben *Homo erectus* site from microfauna.	>1000 bones, *Palaeoloxodon antiquus* fauna: Straight tusked elephant, rhino (*Stephanorhinus kirchbergensis*), horse (*Equus mosbachensis),* cave bear (*Ursus spaeleus, Ursus tibethanicus),* red deer (*Cervus elaphus*), roe	All artefacts flint from local Elsterian sediments: denticulated tools, notched and pointed tools and a small handaxe like tool. Wooden artefact in silver fir (*Abies alba*): 3 broken with groove in one end, 1 has groove in both ends.

						deer (*Capreolus capreolus*), aurochs (*Bos primigenius*), wild boar (*Sus scrofa*) & other incl fish & small mammals.	
	Holstenian c						
	Holstenian IG		Sch I	Sch. 13 I	Oldest Schoningen archaeology. TL date of 400kyr. Lakeshore site, 120 m² excavated 1994.	Steppe elephant (*Mammuthus trogontherii),* bovids, horse and red deer	Flint artefacts: small flakes, notched flake tools & burnt flint

VALLEY OF THE GEISEL, Meresburg district (Mania 1995)

Handaxes – Absent

Geological location and climate – Found in the Körbisdorf gravels in the brown coal mine of Neumark-Süd and Neumark-Nord.

Stratigraphy – The gravels are divided into two sequences, separated by a erosional level and loeses, each with interglacial sandy gravels and overlying glacial gravel. In the upper series alluvial peats and travertines were in the interglacial flucvial sediments.

Archaeology

Lithics – The flint artefacts are from the *Corbicula* sands and consist of a small exhausted disc-shaped core, small flakes, and a chuck with a notched edge.

Fauna – Malacofauna including typical interglacial freshwater species. *Palaeoxodon antiquus*, *Equus sp, Dicerorhinus kirchbergensis,* cervids and bovids

WALLENDORF, near Merseburg (Brühl 2003; Molines 1999)

Date – The artefacts were found in gravels of the eastern edge of the Saale River that date to the early Fuhne cold stage – younger than Bilzingsleben but within the Holsteinian (Brühl 2003)

Handaxes – rough outs are present

Geographical location and climate – The site is located on the terraces of the Saale River near Meresberg.

Stratigraphy – basal levels from a cooling period

Archaeology

Lithics – The c. 1000 artefacts are manufacture frm Baltic flint. Levallois technique is present. The average length of the cores is 85mm, with a maximum of 150mm. There are also some crudely roughed out handaxes.

Interpretation – This assemblage is interpreted as a transitional industry to the Middle Palaeolithic.

GREECE:

NEA SKALA, Kephalonia (Cübük 1976; Dobosi 2003; Kretzoi and Dobosi 1990; Molines 1999; Tourloukis 2003; Villa 2001)

Date – Dating is difficult to date it has largely been on the basis of the lithic typology as archaic – Lower Palaeolithic but this is not necessarily accurate!

Handaxes – Absent.

Geographical location and climate – The site is located in south east Kephalonia on two marine terraces (I and II) of a limestone hill. The terraces are connected by beach deposits.

Stratigraphy – The lack of excavation at the site means that the relationship between the terrace deposits is poorly understood. Given the tectonic activity in the area it is difficult to make any assessments based upon the height of the terraces alone.

Archaeology

Excavation – The site was not excavated, the assemblages were collected.

Lithics – The artefacts are made from quartz pebbles which derive from the terraces. There are two small assemblages, one from each terrace the first consists of 23 artefacts and the second 44. Both assemblages consist of cores, chopping –tools, choppers and flakes (Tourloukis 2003, Cübük 1976).

Fauna – None.

Interpretation – The assemblages are interpreted as archaic but beyond that the lack of excavation makes further interpretation extremely difficult.

PETRALONA CAVE, Chalkidiki peninsula (Bailey 1995; Darlas 1995; Hennig *et al*. 1982; Ikeya 1982; Liritzis 1982; Poulianos 1982, 1983; Stringer 1983; Tourloukis 2003)

Date – The dating of Petralona is controversial (Hennig *et al*. 1982; Ikeya 1982; Liritzis 1982; Poulianos 1982). The overlying stalagmitic floor has been dated to >350ka by Uranium disequilibrium. However, the calcite deposits adhering to the skull have been dated to c. 150-200ka.

Handaxes – Absent.

Geographical location and climate – This cave site is located roughly 50km south east of Thessalonica, on the Chalkidiki Peninsula, near the northern edge of Kassandra, its western spur. The cave itself is part of a horizontal karstic system.

Stratigraphy – A total of 27 levels have been identified in the cave sealed under a staligmatic surface.

Archaeology

Excavation – In 1960 a hominid skull was discovered in the cave by local villagers, the site was subsequently excavated by A. Poulianos and his team. Poulianos' account of the excavations is inconsistent and the nature of the excavations and their reports has made any further post excavation analysis of the site extremely difficult (Tourloukis).

Lithics – The assemblage has been poorly published. The main raw material used is quartz. There are no handaxes and the majority of the industry consists of small tools made on debris, sometimes on flakes with occasional pebble tools. However many of these artefacts do not appear to be anthropogenic.

Fauna – The cave is one of the richest palaeontological sites in Europe. Two faunal groups are identified: the first, early Middle Pleistocene younger than 0.7mya; the second, late Middle to early Upper Pleistocene. The hominin skull is described as archaic *H. sapiens*, however Chris Stringer has suggested that the skull would fit within the middle Middle Pleistocene as *H. heidelbergensis* or *H. rhodesiensis* (Stringer 1983).

Interpretation – Given the considerable problems with this site it is difficult to interpret the assemblage.

PIROS RIVER, Western Arcaia (Darlas and de Lumley 1999; Tourloukis 2003)

Date – Uncertain.

Handaxes – Absent.

Geographical position and climate – The finds were recovered from the middle terrace of the Piros River.

Stratigraphy – Unclear, the finds were collected from the terrace surface.

Archaeology

Excavation – Investigations by a French team led by A. Leroi-Gourhan in the 1960s discovered Palaeolithic remains at this site. The investigations were continued in the 1980s and 1990s by A. Darlas.

Lithics – The assemblage is dominated by pebble tools and simple cores. The artefacts are very rolled (Darlas and de Lumley 1999).

Interpretation – A stratified site nearby of Middle Palaeolithic date also contained a large number of pebble tools which A. Darlas notes may have been misleading if the site was not stratified. The pebble tools are interpreted by Darlas as more indicative of an environmental adaptation common to alluvial and marine terrace sites (Darlas and de Lumley 1999).

<u>HUNGARY</u>:

BUDA, Budapest (Valoch 1968; Vertes 1965)

A small assemblage of pebble tools and flakes was found in Budapest in the 1930s, it was the similarity between these and the Vértesszőlős assemblage that led László Vértes to assign them both to a new 'Buda' industry in the 1960s.

PESTLORINC, near Budapest (Valoch 1968)

A single chopper was found by Valoch on a Mindel terrace of the Danube in 1964. Valoch believed this find was of the same age as the assemblages found at Buda and Vértesszőlős (Valoch 1968).

VÉRTESSZŐLŐS, Gerecse (Dobosi 2003; Kretzoi and Dobosi 1990; Kretzoi and Vertes 1965; Moncel 2003; Pécsi 1990; Valoch 1968, 1995; Vargha-Máthé 1990; Vertes 1965)

Date – The site is currently dated to around 350ka by Ur-Th

Handaxes – None

Geographical location and climate – The site is located in a hollow in the calcareous tuff on the eastern terrace of the Átal-ér River. There are actually 4 localities at Vértesszőlős of which I is the principal archaeological locality.

Stratigraphy – Nine archaeological levels have been identified in total separated by sterile layers of tuff.

Archaeology

Excavation – The site was discovered during a geological fieldtrip by Pécsi in the early 1960s. It was subsequently excavated under the direction of László Vértes from the mid 1960s until his untimely death. His work was continued by Miklós Kretzoi and Viola Dobosi who published the site in 1990.

Lithics –The tools are of very small dimensions (average length 26mm). 50% are in quartzite, 45% in flint material and 5% other rocks. Flakes, fragments and cores all sho signs of retouch.

Interpretation – Vertes argued that the assemblage was part of a Buda cultural complex. Later researches have argued the assemblage is part of a Lower palaeolithic microlithic tradition in central Europe.

ITALY:

ARCE, Liri basin see FROSINONE PROVINCE SITES

BERTOLINO DI MARE, Sicily (di Palma di Cesnola 1996)

Date – Unknown.

Handaxes – Absent.

Geographical location and climate – Bertolino di Mare is located on a terrace at c. 35m above sea level.

Stratigraphy – Surface collection.

Archaeology

Lithics – 20 artefacts in limestone and quartzite have been collected from the site: 12 choppers (10 unifacial and 2 bifacial), 1 polyhedroid (62-136mm), and 6 cortical unretouched flakes.

Fauna – none.

Interpretation – The uncertain date makes interpretation difficult. The assemblage could be anything including Neolithic.

BIBBONA, Tuscany (Palma di Cesnola 1996; Villa 2001)

Date – Eemian to Mindel.

Handaxes – None.

Geographical location and climate – Bibbona is located on a terrace of 'Sicilian' age and from the upper part of a Sicilian marine beach deposit. The greatest part of the Bibbona industry is spread over a large surface near to Podere Sassetta on the left bank of the Botro delle Bugne at 75-80m above sea level.

Stratigraphy – Surface collection.

Archaeology

Lithics - The majority of artifacts are very simple unifacial choppers, more complex 'pointed choppers' very rare. The assemblage consists of: 136 choppers: 83 unifaces, 53 bifaces; 39 flake tools: scrapers and denticulates; 25 cores: usually only one plane of fracture, some discoidal, several centripetal, pebbles with single removals also included as cores)

Fauna – none.

Interpretation – The lack of clear stratigraphy and dating, as well as the small size of the assemblage makes this difficult to interpret.

CÀ BELVEDERE DI MONTE POGGIOLO, Romagna (Antoniazzi, Ferrari, and Peretto 1993; Bietti and Castorina 1992; Bisi *et al*. 1992; Palma di Cesnola 1996; Gagnepain *et al*. 1992; Gagnepain *et al*. 1998; Milliken 1999; Mussi 2001; Peretto 1992, 2006; Villa 2001)

Date – Ca'Belvedere has been claimed to be Italy's earliest Palaeolithic site (Antoniazzi *et al.* 1993; Peretto 1992). Dating is difficult, although a *terminus post quem* for the underlying clay is estimated to be 1.4 - 1.3mya; paleomagnetism of the stratigraphy suggests a date of pre 780kya for the archaeological deposits. The sandy layer is dated by malacological data to 1.2-1.1mya and by paleomagnetism to 0.73-1.3 (Antoniazzi *et al.* 1993). The beach sand is dated by ESR to 720+-210ka at one location and 1,290+- 530ka at another. The combined data suggest a date of c. 900,000 for the archaeological deposits.

Handaxes - Two handaxes have been found from c.4000 lithic artefacts, most of which are from surface collections, no stratified handaxes have been found.

Geographical location and climate – The site is located between Bologna and Rimini, in the foothills of the Emilia-Romagna Apennines at an altitude 200m above sea level.

It is currently 40km from the modern Adriatic coast, although it would have been closer to the coast (Po Gulf) during the site's occupation. The foraminifera, ostracods and and molluscs suggest a marine coastal environment with nearby fresh and/or salt water marshes (Milliken 1999). Limited pollen suggests a cool or cold climate, non arboreal and steppe pollen are dominant.

Stratigraphy – The stratigraphy consists of gravel mixed with sand (a small delta?) containing archaeology, over shore sand which in turn overlies marine clay. The *Argille Azzurre* (Blue Clays) at the base of the sequence date to 1.4-1.3mya (Milliken 1999). The lithic industry was recovered from a sandy deposit overlying the deltaic gravels, known as the *Sabbie Gialle* (Yellow Sands) (Antoniazzi *et al*. 1993; Milliken 1999). This Yellow Sand has been dated to the Matuyama reversed polarity (780kya - 900kya) epoch and ESR on quartz grains gave a range of 0.88±0.13 to 1.19±0.14 mya (Gagnepain *et al*. 1992; Gagnepain *et al*. 1998; Milliken 1999).

Archaeology

Excavation – A limited excavation to depth of 4m yielded a further 1166 flake implements and 153 core implements, mainly from higher in the stratigraphic sequence. This included only 12 retouched tools (5 scrapers, 7 denticulates). Two thirds of the flakes are cortical.

Lithics – The industry is charaterised by knapped pebbles and around 4000 lithics were found on the surface and a further 116 flake artefacts and 153 pebble cores were recovered from excavations. The retouched tools are dominated by single scrapers, notches and denticulates. Chopper-chopping tools and tested pebbles dominate the flaked pieces, although the chopper and chopping tools are largely interpreted as cores as microwear analysis did not provide any evidence of their use (Peretto 2006). Some refitting of cores and flakes is possible the most complex consists of 39 artefacts (Bietti and Castorini 1992; Milliken 1999). Retouched tools are extrememly rare: 5 sidescrapers and 7 denticulates (Milliken 1999). A number of unretouched flakes wer found to have traces of use for a range of tasks: cutting wood, plant material, soft animal tissues.The size is small as flint pebbles less than 10cm are the main raw material used.

Fauna – None survives due to the sandy soil.

Interpretation – Refits suggest expedient knapping of locally available pebbles. Other similar sites in the area have been identified but not investigated. For Peretto this site represents the opportunistic knapping of locally available pebbles (Peretto 2006).

CAPELVENERE, nr Santa Caterina, Salente Peninsula, Leche (Palma di Cesnola 1996; Molines 1999; Villa 2001)

Date – Wurm II to Wurm II-III stage.

Handaxes – None.

Geographical location and climate - Located near to Torre dell'Alto in the Salent Peninsula.

Archaeology

Excavation - Excavated in the early '70s by the Quaternary ecology laboratory of the Florence university anthropology institute.

Lithics - The industry is on silicified limestone and flint and is very poor. Quinson points are present along with Tayac points, and scrapers.

Fauna – none

Interpretation – Described as developed Tayacian.

CASELLA DI MAIDA, Catanzare (Palma di Cesnola 1996; Gambassini and Ronchitelli 1981)

Date – Beginning of the Mindel and the marine regression at the end of the Sicilien.

Handaxes – None

Geographical location and climate – The artefacts were found on the side of a wide terrace 80-130m above sea level. At the base of the geological sequence are marine deposits and the excavators believe that the Pleistocene human occupation at the site occurred following a drop in sea levels.

Archaeology

Excavation - The assemblage at this site was collected partly through surface collection and partly through excavations undertaken in the early 1980s.

Lithics - The main raw material is quartz and quartzite and rarely flint. It consists of 205 pebble tools and 210 flake tools. The pebble tools range from 38mm to 136mm in length with the majority between 50 and 100mm. Unifacial choppers are more common than bifacial ones. The flake industry is relatively developed, mainly consisting of short scrapers with a lesser percentage of denticulates and notches. The flake tools are between 30 and 50mm long and generally thick with natural or flat butts. Of the cores 17 are polyhedral, 14 have centripetal removals, 5 have a single plane of removals and the rest have opposing platforms. The cores range in size from 42-86mm.

Fauna – none.

Interpretation –This pebble tool assemblage appears to be associated with activity on the beach, and has been interpreted as an evolved stage of the Italian Pebble Tool Culture (Palma di Cesnola 1996).

CASTRO DEI VOLSCI, Sacco basin see FROSINONE PROVINCE SITES

CHUISE DE IDICE QUARRY, Emilie-Romagne (Bisi and Perreto 1985; Palma di Cesnola 1996 ; Villa 2001)

Date – Unknown.

Handaxes – Some.

Geographical location and climate – This is an old quarry site in the Emilie region of Italy and is the most significant site in the area with a total of c. 260 artefacts recovered from it.

Stratigraphy – unknown.

Archaeology

Lithics – The artefacts are divided into four categories on the basis of their condition. The material has been partly published by Bisi *et al*. (1985). The industries consist of: a) large flakes, flakes and pieces with flat butts in the more rolled categories; b) small flakes, big blades and pieces with facetted and dihedral butts in the least rolled series. There are also amygdaloid bifaces and choppers. Generally speaking the more evolved the pieces the smaller they are.

COLLE MARINO, Anagni basin see FROSINONE PROVINCE SITES

COLLINAIA, Livourne, Tuscany (Palma di Cesnola 1996)

Date – Mindel-Riss.

Handaxes – None.

Geographical location and climate - Located on a terrace 'Fattoria Pianacce' near the left bank of the Rio Ardenza 70-85m above sea level.

Archaeology

Excavation – The artefacts have been collected from the surface of a red soil – which is considered to probably be a Mindel-Riss palaeolsol.

Lithics – The industry is on pebbles and fragments of tabular jasper. The artefacts consist of : 263 Choppers (more than Bibbona) – 51.3% unifacial, 48.7% bifacial of average length 56mm (range from 30-100mm) with a predominance of side rather than end choppers. The flake industry is poorer than Bibbona: three notches, three becs and some large scrapers. Debitage is rare and flakes absent.

Fauna – none

Interpretation – The excavators consider this site to represent an ancient phase of the Italian pebble culture.

COLOMBO CAVE, nr Toirano, Savone (Palma di Cesnola 1996)

Date – Riss II to Wurm, mainly by geological comparison.

Handaxes – none

Geographical location and climate – A cave site located at 248m above sea level, higher than the majority of the caves in the region and therefore undisturbed by the sea.

Stratigraphy – The cave deposits consist of a series of clays with stalagmitic layers.

Archaeology

Excavation – The cave deposits were excavated in the 1950s.

Lithics – The tools are generally on quartz and quartzite and the assemblage consists of c. 120 flake tools a large number of debitage items and 16 cores (discoidal and polyhedral) and one hammerstone. Levallois elements are present from the lowest levels but these are all atypical. Notches, denticulates etc are very rare; racloirs are the most common tool type. The retouch is generally scalariform or subscalariform.

Fauna – The fauna has not been well preserved.

Interpretation – The upper levels have what could be described as a developed Mousterian industry, the pre-Mousterian industry is found in layers 11, 10, 8, 6 and 5 (the other beds are very poor or sterile). The archaic form of this industry is ‘indisputable’ but it may be over emphasised by the poor quality of the raw material.

EMILIE-ROMAGNE REGION, Preappennines (Palma di Cesnola 1996)

Date – Mindel.

Handaxes – Bifaces have been found both on the surface and within the conglomerate attributed to a second Acheulean series.

Geographical location and climate – A large number of sites from this area have been found with pebble tool industries. However at Emilie, between Emilia and Bologne, the chronological position of the 'ancient Clactonian' is best illustrated: the sites of Cà Bedogni, and quarries of Chiuse d'Idice (the largest with c.260 artefacts), S.A.F.R.A. and Dall'Olio have all provided artefacts which are believed to date to the Mindel glaciation. The artefacts derive from a gravel that lies below a red palaeolsol that indicates a long period of subtropical conditions and is believed to date to the Mindel-Riss interglacial.

Stratigraphy – A bed of sand and gravel of varying thickness has been identified which contains in places a clay and yellow sand of littoral and partly fluvial origin. This formation could correspond to the yellow sand deposit found at the pebble tool culture site of Mont Poggiolo.

Archaeology

Excavation – Much of the research in this region has been undertaken in the 1950s and 1960s by Peretto, Cremaschi, Bisi and others who brought to light a series of sites in the Preappenine region consisting of rolled Clactonian and proto-Levallois artefacts considered to be comparable to those of Mount Gargano and Abruzzes. The synthesis resulting from the studies of Cremachi and Peretto (1976) highlighted the sequence of sites along the Correcchio and Zena Rivers.

Lithics – The conglomerate contains two series of stone tools divided on the basis of the physical nature of the artefacts – one is more rolled than the other. The more rolled series contain large Clactonian flakes and proto-Levallois elements apparently associated with a subcircular biface. Other bifaces, archaic forms, have been collected from the surface although some authors have noted that these bifaces could equally be attributed to the Clactonian level. The second series is Acheulean.

Fauna – The base of the yellow sand contains faunal remains and has been ascribed to the end of the upper Villafranchian.

Interpretation – A number of sites from this area (c. 100-200m above sea level) have been found which have pebble tool industries: Cà Romania, Cà Bianca, Cà Poggio, Serra near to Castelbolognese, all in Bologne province; Podere Canestri near to Forlimpopoli and Cà Paradiso di Covignano near Rimini in Forli province. A similar situation is seen on the terraces of the Sillaro near to Toscanella. Here a similar rolled Clactonian industry is found mixed in with a less rolled Acheulean assemblage. It appears that in this area the Clactonian is locally widespread with a list of some 20 sites between the Savena and Idice.

Unfortunately the Clactonian assemblages for this area have not been widely published.

FIUMEGRANDE RIVER, SALEMI and SANTA NINFA, Trapani province (Palma di Cesnola 1996)

Date – unknown

Handaxes - none

Geographical location and climate – The Fuimegrande River terraces.

Stratigraphy - The lowest terrace is at c. 100m above sea level on the right bank and contains both rolled and unrolled tools. A higher terrace, c. 200m, the tools are always rolled.

Archaeology

Excavation – Rich pebble industries on quartzite have been revealed by excavations in the 1990s in this area (Tusa 1990) but are little published.

Lithics – It seems that there are two industries present in the region: one, probably the oldest, with simple choppers and the second, many of the lower terrace sites, with more evolved choppers associated with a rich flake tool industry.

Fauna – unknown

FONTANA LIRI, Liri basin see FROSINONE PROVINCE SITES

FROSINONE PROVINCE SITES: COLLE MARINO, Anagni basin, ARCE and FONTANA LIRI, Liri basin and CASTRO DEI VOLSCI, Sacco basin (Palma di Cesnola 1996)

Date – Geologically speaking Colle Marino, Arce and Fontana Liri are all older than Castro dei Volsci. At Colle Marino the layer containing the lithics is dated to >700,000ka by K-Ar dating but others have suggested ages in excess of 800,000. The Castro dei Volsci terrace deposits contain volcanic minerals dated to after 700kya. The age of the industry is estimated to be c. 500ka with a *terminus ante quem* represented by a red sand corresponding to the Pofi horizon and dated to 400ka.

Handaxes – A few ‘proto handaxes’ are reported.

Geographical location and climate – These sites are located around the Anagni, Liri and Sacco basins in the Frosinone Province.

Stratigraphy - Arce is located in the basin of mountain Nero-Vallefredda-Arce a depression filled with clay believed to have been created in the Lower Pleistocene. The lithic artefacts are found at the top of the complex stratigraphic sequence in layers which seem to represent the silting up of a lake - the lithics are associated with the uppermost sand and gravel layers.

At Colle Marino the pebble tool industry is located in the upper part of a bed formed by calcarious clays with travertine block and limestone fragments. Overlying this is a layer of travertine and at neighbouring Nocicchio hyena remains have been found just below this travertine layer, associated with in situ lithics.

Close to Fontana Liri a palaeosol is identified which seems to correspond to the upper gravels at Arce and contains the same industry, possibly in situ.

Castro dei Volsci has an industry again found in a fluvial gravel terrace deposit located on the right bank of the Sacco river c. 126m above sea level.

Archaeology

Excavation – All these sites were discovered by I. Biddittu.

Lithics – The raw material at Colle Marino is blocks of limestone, often irregular in shape and it is these that are suggested to give the industry its archaic appearances. From a typological point of view there is a predominance of unifacial and bifacial choppers as compared to polyhedroids or flake tools (mostly scrapers and denticulates). There are also numerous pebbles with single removals. The pieces are generally large c. 150mm.

The industries at both Arce and Fontana Liri are also made predominantly on limestone At Arce these again consist of unifacial choppers, rarer bifacial choppers and there are few pebbles with multidirectional removals. The pieces vary from c. 70-132mm. The flake industry includes denticulates, scrapers and a Clactonian notch. Generally speaking the unretouched flakes have dorsal surfaces displaying cortex and flat or natural platforms, discoidal forms are present but very rare. At Fontana Liri other types of tools are found than those at Arce – choppers with very flat removals and polyhedroids. There are also a greater number of flake tools – mainly side and transverse scrapers and there are a number of pebble segments among the unretouched flakes.

The pebble tools at Castro dei Volsci are mostly on flint and more rarely on quartz and silicified limestone. The majority have ‘desert’ patina. Bifacial choppers dominate the assemblage, often the removals cover a large portion of the piece and there are end and side choppers in equal measures. Of eight examples the size varies from 50-

104mm. There is also a ‘proto-biface’ (84mm x 65 x 31), true discoids (40-60mm) and a polyhedroid (49mm x 42). There are flake tools: lateral and transverse scrapers, denticulates all c. 40mm. Unretouched flakes occasionally have dihedral butts. The cores show one or two planes of knapping and some are discoidal. This assemblage is considered by Biddittu to be more developed than that of the other sites in the region.

Fauna – unknown

Interpretation – Pebble tool industry.

Nr GUALDO TALDINO, Umbria (Palma di Cesnola 1996)

Unpublished reports of choppers in calcite from this region exist.

GUIMENTINA VALLEY, nr Caramanico, Maiella, Abruzzes (Palma di Cesnola 1996; Molines 1999; Villa 2001)

Date – Unknown.

Handaxes – None.

Geographical location and climate - An important ‘developed Clactonian’ site located at c. 700m above sea level in an ancient lake basin, cut through by a river in more recent times.

Stratigraphy - The stratigraphy is complex. The industry is concentrated in beds 30 and 33 with beds 20 and 40 of less significance in terms of quantity of artefacts and beds 18 and 24 extremely poor.

Archaeology

Excavation – unknown

Lithics – The industry is mainly on flint with are over 700 artefacts in total from the site: majority are unretouched flakes (315), then atypical flakes (those that have been damaged through use, slightly retouched or unretouched) (275), racloirs (58), cores (44), notches (16), denticulates (15) and 2 hammer stones and a grattoir. The vast majority (423) of the artefacts were from bed 33. The sizes vary but there are some artefacts of 130mm length and others of only 40-70mm. The debitage is described as typically Clactonian with large bulbs, cortical flakes etc. The cores are typically polyhedral, more rarely pyramidal; one core shows parallel removals and one other on a pebble could be interpreted as a latero-distal chopper.

Fauna – Unknown.

Interpretation – described in the literature as Clactonian.

ISERNIA LA PINETA, Molise (Palma di Cesnola 1996; Coltorti *et al*. 1982; Guisberti 1991; Milliken 1999; Mussi 1995, 2001; Peretto 1991, 1994, 2006)

Date – The lower part of the sequence has been dated by palaeomagnetism to a period of inverse polarity – considered to predate the Brunhes/Matuyama limit (Coltorti *et al*. 1982). Dates by K/Ar analysis of sanadine crystals from deposits overlying the archaeological levels gave results of between 680 and 730ka (Mussi 2001). More recently dates on sanidine crystals from the layer which lies immediately above the archaeological deposits using Ar/Ar analysis have suggested a *terminus ante quem* of 603+-10 ka (Coltorti *et al*. 2000 as cited in Mussi 2001)

Handaxes – absent.

Geographical location and climate - The site is located at 400m above sea level in the outskirts of Isernia, roughly in the centre of the Italian peninsula. The fauna and pollen suggests an open environment (Peretto 1991).

Stratigraphy - The stratigraphic sequence relates to the infilling of the basin of Isernia as follows (base to top):

1. Lacustrine clay sediments
2. Travertine
3. Red palaeosol formed on the travertine and remains only in fragments
4. Fluvial deposits
5. Volcanic rich deposits – dated to 736ka +-40ka K-Ar
6. Fluvial deposits interrupted by a palaeosol
7. Pyroclastic sediments with the deepest parts changed to a very developed palaeolsol
8. Volcanic tuff – dated to 550ka +- 50ka K-Ar

There are four palaeo-surfaces of occupation, three in sector I of the excavations and one in sector II. They are all situated between stratigraphic layers 5 and 3 and therefore are considered to be older than c. 736ka. Initially Sector I had 2 archaeological layers (Sett.I t.3c – earliest- and Sett. I t.3a) and Sector II only 1 layer (Sett.II t.3a most recent). Later t.3 S10 was discovered between these levels (Anconetani *et al.* 1992). The most impressive level is Sett. I t.3a which had a concentrated accumulation of lithics and bone over and area of c. 24m^2: 1256 stone tools and 722 bones of bear, elephant, rhino, bison and deer (Giusberti *et al.* 1991). Rolled artefacts are present between the layers and these are believed to have been derived from deposits upstream.

Archaeology

Excavation – The site has been the subject of excavations and systematic research since 1979 by the University of Ferrare. Excavation is ongoing but to date c. 300m^2 have been opened and 4 archaeological layers identified believed to be closely related chronologically, with archaeological deposits estimated to extend over 30,000m^2. The excavations were initially focused on two separate but nearby areas – sector I and sector II.

Lithics – Choppers are present in varying numbers throughout, with the exception of the most recent surface (Sett. II t.3a) in which they are absent, and are manufactured on limestone pebbles, with a few exceptions on travertine. The flake tools are manufactured on flint plaquettes and more rarely on limestone and display a limited and repetitive typology. Denticulates dominate – sometimes making up as much as 90% of the asssemblage. There are also notches, often Clactonian, scrapers and Tayac points. Carinated pieces are also very common. The choppers are often larger than 110mm but the flake tools are very small – c. 30-20mm. The platforms of the flakes are usually plain but with a steep incline.

Flakes	Flaked pieces	Retouched tools	debris	total
1529	100	1296	1664	4589

From Sett.II t.3a (Ferrari *et al.* 1991)

Fauna – The faunal assemblage is extremely rich and suggests a prairie/steppe fauna with a climate that depends heavily on a single wet season. Species present include bison, rhinoceros, and elephant.

Interpretation – The main characteristic of this site is the complexity and richness of particular palaeo-surfaces which testify to a cyclical occupation at the site. Similar concentrations of flint artefacts and bones are found on superimposed layers indicating a similar use of space through time. The concentrations of artefacts are interpreted as the remains of camps. However the middle surface, 3A, seems to show a very different activity over tens of square metres. Animal bones seem to have been deliberately spread in a ‘pavement’ over a surface including tens of bison skulls, rhinoceros skulls and mandibles and tusk and long bones of elephants. These parts of the animals have been selected as vertebrae and foot parts are totally absent. It is possible that this could represent the developing/occupation of an area very close to river.

LAGO ARVO, La Sila mountains, Calabre (Molines 1999; Villa 2001)

Located at 1278m above sea level an industry on quartz pebbles has been reported but is virtually unpublished.

LA POLLEDRARA DI CECANIBBIO, Rome (Anzidei 1996, 2001; Palma di Cesnola 1996)

Date – From correlation with volcanic deposits the site is dated to MIS9.

Handaxes - none

Geographical location and climate – The site is north west of Rome c. 87m above sea level on a terrace. The archaeological layer is associated with a palaeosurface deposits within a stream bed that cuts through volcanic deposits associated with the Sabatian Volcano. The volcanic deposits have been dated to 430ka.

The archaeological deposits are within a swamp-like basin where stone and bone tools are associated with faunal remains. **Archaeology**

Excavation – Excavated between 1975 and 1999 and area of c. 750m has been exposed.

Lithics –Around 250 stone artefacts have been recorded all made on small silicious pebbles. The majority of these artefacts were associated with the bones. The assemblage includes choppers and chopping tools, scrapers, notches and denticulates. The cores are variend including uni and bidirectional cores as weel as cetrepetally knapped pieces. As well as stone tools bone tools have also been identified on *Palaeoxodon antiques* bones.

Fauna – There is a rich faunal assemblage with over 9000 fragments of bone. The assemblage has large quantities of *Elephas antiquus* and *Bos primigenius. Cervus Elaphus, Equus caballus, birds,* Leporidae and rhino are also present.

Interpretation – The use of bone for larger tools and the pebble tool assemblage is thought to reflect the scarcity of suitable raw material in this part of Italy.

MADONNA DEL FREDDO, River Alento, Abruzzes region (Palma di Cesnola 1996; Ramilli 1994)

Date – The ages of these terraces are uncertain but 'Clactonian' artefacts are reported as having been found in deposits of Rissian age.

Handaxes – Some rough, atypical bifaces are present.

Geographical location and climate – The site is located on the terraces of the Alento River c. 100m above sea level.

Stratigraphy - The geological stratigraphy is composed of alluvial sands and gravels overlying tertiary clays.

Archaeology

Excavation – The site was studied through survey and excavations in the 1950s and 1960s.

Lithics – The 'ancient' Clactonian industry is similar to that in at Mont Gargano. As the artefacts are rolled there are a number of examples of 'pseudo retouch'. The exact number of tools is unknown but scrapers, denticulates, notches and becs are identified and the tools vary in size from 30-126mm. the flakes are typically short with typically Clactonian bulbs and platforms. There are also a number of multidirectional cores of pyramidal/sub-pyramidal type. This location also yielded a number of 'archaic bifaces' which were defined by Radmilli, one of the excavators, as Abbevillian (Palma di Cesnola 1996). All of these bifaces were surface finds, possibly from deposits disturbed during the construction of a road, and their stratigraphic association with the Clactonian assemblages cannot be established.

Interpretation – The correlation between handaxe and non-handaxe layer is unknown and difficult to interpret. Overall the site has been interpreted as Clactonian.

SURFACE OF MAGAGGIARI, Realamont, SW Sicily (Palma di Cesnola 1996)

Date – Unknown

Handaxes – None.

Geographical location and climate – This is a sub-horizontal surface c. 130m above sea level which is the result of continental erosion and rests on a discontinuity in the Calabrian clays. It is covered in a band of pebbles of flint, limestone, siliceous limestone and quartzite. At 60-70m above sea level is a second surface, the 'Macauda level', which is the result of marine erosion. This dates to the Sicilian and is overlain by cross bedded brown sands which have at their base a conglomerate of siliceous pebbles.

Stratigraphy - Further to the south east, at the location of Punta Bianca Gambassini observed the following sequence: marine Sicilian deposit; sand and gravel with the large pebble tools; sand with the small pebble tool industry. This led him to conclude that there were two phases to the industry: earlier macro- and later micro-pebble tools (Palma di Cesnola 1996).

Archaeology

Excavation – Gambassini excavated sondages in 1969 into the terrace of Casa Biondi to the east of Faro Rossello and found that the largest sized tools came from the Macuada surface gravels, further towards the sea, where the surface is associated with a thicker bed of sand the tools are much smaller. However the limited size of the excavations means that these conclusions cannot be conclusive.

Lithics – The industries on flint and quartzite pebbles are spread throughout the region: industries with choppers and flakes of large and medium size. The Macro-industry had unifacial, bifacial choppers, trihedral tools and polyhedroids (all between 60 and 220mm) and plain or retouched flakes. The later phase was typified by small bifacial or multifacial choppers (25 – 60mm) and denticulates and scrapers on flakes sometimes on flakes with facetted butts.

Fauna – none

Interpretation – While there have been number of assemblages reported from Sicily the problematic dating and lack of clearly structured excavation means that no clear Middle Pleistocene sites are found there.

MARCHES REGION (Palma di Cesnola 1996)

This region has very few examples of 'Clactonian' assemblages all of which are very rolled, isolated surface collections.

MARIO BERNARDINI, n. of Santa Caterina, Pouilles (Palma di Cesnola 1996)

Date – Dating is difficult but the excavator claims a Wurm II date based on the faunal remains.

Handaxes – None.

Geographical location and climate - A cave site.

Stratigraphy - The base of the stratigraphic sequences contains what is described as a developed Tayacian assemblage. Immediately above there is a developed Mousterian assemblage.

Archaeology

Excavation – The site was excavated in the early 70s by Borzati von Lowenstein.

Lithics – Bed 13-6 are characterized by Quinson type tools – thin and pointed. There are also a large number of carinated scrapers with rare bifacial points of poor quality and small size. The bifacial scraper-choppers seen at Torre Dell'Alto are totally absent.

Interpretation – Tayacian and Mousterian.

MENFI, Contrada Cavarretto, Sicily (Palma di Cesnola 1996)

Date – The dating is uncertain.

Handaxes – None.

Geographical location and climate - Located on a high terrace 130m above sea level.

Stratigraphy – Surface collections from and undated terrace.

Archaeology

Excavation – Collected not excavated.

Lithics –63 quartzite artefacts have been collected ranging in size from 48mm to 87mm: 23 choppers (11 unifacial and 12 bifacial), Polyhedroids, scrapers, a 'bec, a single core and 17 unretouched flakes.

Fauna – None.

Interpretation – The date and stratigraphic context are uncertain and these finds could be of any date.

MONTAUTO, nr Vulci, Viterbe, Latium (Palma di Cesnola 1996)

Date – Unknown.

Handaxes – A few 'proto-bifaces' have been recovered otherwise handaxes are absent.

Geographical location and climate – The site is located on a terrace of the River Fiora.

Stratigraphy – Terrace surface finds.

Archaeology

Excavation – The industry has been collected from the surface of a terrace of the River Fiora over an area of c. 450 by 150m.

Lithics – A pebble industry on volcanic, limestone, marne, silicious limestone, sandstone and quartzite. The assemblage consists of 81 choppers (50 unifacial and 31 bifacial and from 51mm-165mm length), 18 discoids (more or les regular and with rare centripetal removals and from 40mm to 75mm length), 29 sub-pyramidic polyhedroids (42-100mm length), and three proto-bifaces; there is a dominance of side choppers. The flake industry is relatively abundant with 146 artefacts, a large number of scrapers, including denticulates and notches, largely side scrapers. There are also 366 unretouched flakes. The flakes are for the most part on vulcanite and are wide and thick with a large amount of cortex on the dorsal.

Fauna – None.

Interpretation – The industry from this site is noted for the large number of discoids and polyhedroids and is considered belong to the later Italian Pebble Culture. However, the lack of dating and clear context makes interpretation difficult, the interpretation is largely based on the typology of the tools.

MONT DELLE GIOIE, River Aniene, Latium (Palma di Cesnola 1996)

Date – Riss.

Handaxes – None.

Geographical location and climate – The site is located on the middle terrace deposits about 45m above sea level, on the right bank of the Aniene, near its confluence with the Tiber, virtually in the city of Rome. The middle terrace of the Aniene is attributed to the Riss, bed 9 of this site which contains both lithics and fauna lies below a layer representing a cold episode (Riss II).

Archaeology

Excavation – The site was excavated in the 1930s.

Lithics – The industry is on flint pebbles: 62 tools (59 on flake and 3 on pebbles). It varies from fresh to rolled but scrapers dominate, denticulates make up c. 12% and there are two notches. There appears to be no Levallois present but there are three bifacial choppers and there are some similarities with the developed Tayacian assemblage from Pouilles.

Interpretation – Developed Tayacian.

MONT GARGANO, Varano Lake (Palma di Cesnola 1996)

Date – Dating for these sites is extremely difficult.

Handaxes – The non-biface assemblage is interstratified with Acheulean handaxe levels.

Geographical location and climate – A number of sites are known from terrace deposits in this area. The pebble tool industry artefacts have all been collected from the surface of a Middle Pleistocene terrace c. 90m above sea level, while the ‘Archaic Clactonian’ artefacts have been found particularly in those areas where the river has deposited thick gravel sediment, sometimes in terraces. There is a particular concentration in the area of the Romandato River (in Rodi Garganico). The site at the mouth of this river has also produced a middle Acheulean industry. However, around

490 archaic 'Clactonian' artefacts have been recovered mixed in with this industry. The Clactonian material is reported as being easily recognised as it is much more rolled than the Acheulean artefacts.

Archaeology

Lithics – This site is reported as having both pebble tool industries and 'archaic Clactonian' artefacts. The interesting thing about this site is that the raw material is considered to be good quality.

Pebble tool assemblage - Of all the 366 worked pebbles there are 82 unifacial choppers with isolated removals and 237 bifacial choppers with a wide degree of variation in their complexity, and some 'proto-bifaces'. Also mentioned by the excavators (Galiberti and Calboli) are 19 trifaces, 28 multifaces (mainly globular/polyhedroids). The largest of the tools is 200mm. The flake industry is very poor with only 88 pieces: 44.3% denticulates; 28.4% short scrapers but also burins and other scrapers. There are 27 cores, mostly discoidal or types with one or two planes of removals. The excavator cites the dominance of bifacial choppers and presence of proto-bifaces as indication that this site is a more advance technological stage.

Archaic Clactonian assemblage – This site has a rich industry of archaic Clactonian flakes. Two series of Clactonian artefacts have been identified on the basis of their degree of modification. The first consists of 256 pieces and is the most rolled. There are c.30 choppers (mostly bifacial), rare 'proto-bifaces', 1 spheroid, 19 discs, 6 'coins', 11 cores – mostly on pebble fragments. 176 flakes – 64 of which are very large, 112 are average. There are also 16 pebble fragments or naturally broken pebbles. The flakes are usually short and fat with high frequencies of cortex on the dorsal. The platforms are flat and steep, the bulbs of percussion prominent and often double. The second series of Clactonian artefacts (234 items) consists of only 2 choppers, a probable pic, 5 discs and discoids, a pebble segment and a core. The rest of the assemblage consists of flakes of slightly smaller size than those in the first series, and with a more complex dorsal scar pattern (often parallel scars). The flakes are also often larger.

Interpretation – The area is interpreted as having a number of different sites of different dates including a pebble tool industry, an archaic Clactonian industry, Clactonian and Acheulean levels. The archaic Clactonian at the site of Romandato-embouchure is interpreted as consisting of an earlier archaic phase and a later more evolved phase, this division is based upon a broad statistical comparison and not a comparison between individual pieces. The near absence of choppers, the reduction in size of the flaked pieces and the debitage that seems to represent a very basic form of Levallois characterise the second series. The ‘archaic Clactonian’ is limited to the southern areas of the promentary, the more evolved form is more widespread (Palma di Cesnola 1996).

MONT PEGLIA, nr Orvieto, Umbria (Palma di Cesnola 1996)

Date – The faunal remains at the site suggest an early Cromerian age

Handaxes - none

Geographical location and climate - A karstic cave site.

Archaeology

Lithics – While perhaps better known for its hominin remains than its lithics some artefacts have been found: a unifacial discoidal chopper and four retouched flakes (inverse denticulate, transverse scraper fragment, a doubtful side scraper and a flake with marginal retouch).

Interpretation – It has been suggested that the industry from this site is more closely related to the pebble culture of west than of central Europe but given the limited nature of the assemblage this cannot be demonstrated. It is considered to be an anomaly in the Italian pebble tool complex.

MONTE POGGIOLO, see CA’ BELVEDERE

NOTARCHIRICO, see VENOSA-NOTARCHIRICO

POGGIO CAVE, Campanie, Marina di Camerota coast, Salerne (Palma di Cesnola 1996)

Date – Unknown.

Handaxes – None.

Geographical location and climate – Cave site.

Stratigraphy - The site has been subdivided into three horizons: 13-11; 9-3; 2. The lower level only yielded 50 pieces, the middle some 4300 tools, and the upper 550 tools.

Archaeology

Excavation – This site was excavated in the 1960s and 70s by Palma di Palma di Cesnola.

Lithics – The industry is in flint, jasper and quartzite. The rich assemblage of the middle beds is largely composed of racloirs of average quality. The retouch is sometimes scalariform and often very invasive, although never quina type. The maximum artefact size is only c. 47mm. After the racloirs the denticulates are the most common. Levallois technique is not present at all and facetted butts are rare. There are a number of Quinson style pieces and also Clactonian notches. The assemblages from the upper bed are typologically very different and in terms of retouch racloirs are not so dominant; there is quina retouch but no Levallois, although some flakes show a regular removal of preceding flake on the dorsal scar patterning.

Fauna – Human remains have been found at this site in the form of a molar and a talus but neither appear to have been solidly identified.

Interpretation – Interpreted as a pre-Mousterian site.

REBIBBIA-CASAL DE'PAZZI, Rome (Palma di Cesnola 1996)

Date – Unknown.

Handaxes - A biface was found at the site but this is believed to have come from a deeper level than the rest of the industry.

Geographical location and climate - Flooding at this site has deposited large amounts of faunal and lithic material in the bed of an ancient river which cuts through travertine.

Archaeology

Lithics – The material recovered is considered to be similar to Mont delle Gioie and Sedia del Diavolo.

Interpretation – The site is considered to be likely to represent a pre-Mousterian industry.

RIU ALTANA see SARDINIA

SACCOPASTORE, Rome (Palma di Cesnola 1996)

Date – Unknown.

Handaxes - None

Geographical location and climate - This site is a located on the lower terrace of the Aniene close to the confluence with the Tiber

Stratigraphy - The industry is in the layer immediately above that which contained the second human skull, in a layer of sandy gravels.

Archaeology

Lithics – Unfortunately the assemblage is rather poor with only 11 artefacts including a Levallois flake.

Fauna – This site is famous for its two Neanderthaloid skulls discovered in 1929 and 1935 by Blanc and Blanc and Breuil.

Interpretation – A pre-Mousterian site similar to Torre in Pietra.

SA COA DE SA MULTA see SARDINIA

SAN BERNADINO MAGGIORE CAVE, Colli Beirci, Vicence, Venetie (Palma di Palma di Cesnola 1996)

A cave site located at 135m above sea level. The industry contains Clactonian notches and other archaic types but is characterised by its small size, particularly in upper horizons. The assemblage is interpreted as pre-Mousterian.

SA PEDROSA-PANTALLINU see SARDINIA

SARDINIA (Palma di Cesnola 1996)

A site in the valley of the Riu Altana, near to Perfugas in the province of Sasdsari has an assemblage ascribed to it that is considered to be 'ancient' Clactonian, however this is problematic given that the island was separated from the mainland during the Pleistocene by a strip of sea that would have been difficult to cross. The industry is described as consisting of around 30 rolled artefacts: flakes and blade-like flakes of average dimensions, blades are also present. The chronostratigraphic context is not properly understood however.

However, more recently an *in situ* 'Clactonian' site has been excavated near to Sa Coa de sa Multa on a high terrace – at present this is the only *in situ* Clactonian site currently known of in Italy. The industry is very archaic with both average sized and larger pieces with wide retouch and seems to be different from that from the Riu

Altana. The palaeolsol containing the artefacts seems to be very developed and to represent an important interglacial phase.
At Sa Pedrosa-Pantallinu, Sassari, a developed 'Clactonian' site has been identified in a Riss-Wurmian deposit on a Riss terrace. The majority of artefacts are retouched flakes, followed by denticulates, then scrapers. The retouch is rarely scalariform and there are c. 6% upper pal types. The same facies seems to be represented by the less rolled series in the valley of Riu Altana. De Codrovulos , located in the immediate area of the same terrace as Sa Pedrosa, has provided a secondary context site which is slightly different and may be more recent. The dating and sequencing of sites in this area is extremely problematic. Currently two hypotheses are possible for the Sardinian Clactonian: firstly that the developed Clactonian evolved separately on the island or secondly that it is in some way related to that on the continent.
However given the dating problems these industries may not be of Middle Pleistocene date at all.

Location Near SASSOFORTINO, Roccastrada, Grosseto Province (Palma di Cesnola 1996)

Date – Unknown.
Handaxes – None.
Geographical location and climate – Artefacts were collected from a plateau c. 530m above sea level near to Sassofortino.
Stratigraphy – surface collection.
Archaeology
Lithics – A pebble tool industry on quartz, quartzrenite and quartzrudite. It consists of c. 150 choppers, mostly simple, unifacial choppers and around 20 simple flakes. Polyhedrals, cores and flake tools seem to be completely absent.
Fauna – none
Interpretation – Pebble tool industry.

SEDIA DEL DIAVOLO, River Aniene, Latium (Palma di Cesnola 1996)

Like Mont delle Gioie this site is situated on the terrace deposits of the Aniene River close to its confluence with the Tiber, Sedia de Diavolo is located on the left bank. The stratigraphic sequences of the two sites are very similar and the industry comes from the same gravels and is associated with similar fauna. There are only 15 tools which include two choppers. The fauna is similar to that at Mont delle Gioie although in addition to the large pachyderms, aurochs and deer there are also horses, hare, and rabbit. In addition to the fauna and lithic remains there has also been a femur fragment and a metatarsal of a hominin found at the site which is considered to be morphologically more archaic than Neanderthal.

LA SELVOTTA, Maielletta, Abruzzes (Palma di Cesnola 1996)

Handaxes – 10 archaic looking bifaces.

Geographical location and climate – A cave site, probably karstic in origin at c. 750-800m above sea level on the western side of Maielletta. The excavator Tozzi believed that the area would have had marshes and small lakes at the time of occupation.

Stratigraphy – Limited stratigraphy in sondages.

Archaeology

Excavation – The site was found in 1977 by Tozzi near to Valle Guimentina. All investigation has been surface collection with some sondages which have given little result.

Lithics – The assemblage consists of around 300 tools. 10 bifaces, archaic in form, have been found at the site along with some 'proto-Levallois' flakes. Scrapers are dominant, mainly simple forms and the notches and denticulates make up a greater percentage than at Valle Giumentina.

SICILY (Palma di Cesnola 1996; Villa 2001)

In Sicily 'Clactonian' industries in the broad sense are located in the eastern part of the island in the provinces of Catane, Enna and Syracuse. They are generally on quartzite, more rarely on volcanic rocks or flint. The majority of the material is rolled and has been collected from the surfaces of terraces along the River Simeto in the area between the tributary Dittaino and the end (Palma di Cesnola 1996). Other artefacts have been found from the south of this region from sites including Poggio Monaco, Stimpato, Muglia Nord, Castellaccio, Fontanazze, Agira, Montagna di Ramacca, Piano Meta and others. The industry from these sites is essentially composed of fairly big flakes of 'Clactonian' morphology, with rare blade elements and plain butts (Palma di Cesnola 1996). Choppers on pebbles are present throughout but in quite limited numbers, except at Poggio Monaco where a good number of pieces on natural fragments of rock have been noted (Palma di Cesnola 1996). However dispite these numerous observations none of these finds are securely dated and while some may be of Middle Pleistocene date there are in fact no securely dated archaeological deposits until the Upper Palaeolithic (Villa 2001). The lack of clear Middle Palaeolithic artefacts from the island also suggests that the presents of anything earlier is unlikely (Villa 2001)

TORRE DELL'ALTO, nr Santa Caterina, Salente Peninsula, Leche, Pouilles meridionales. (Molines 1999)

Date – The industry is believed to date to the Riss-Wurm interglacial.

Handaxes - none

Geographical location and climate - A cave site.

Archaeology

Excavation – The site was excavated in the 1960s by Borzatti von Lowenstern.

Lithics – The site is reported to have a developed Tayacian industry in the lower levels. The raw material is mainly silicious limestone or small marine flint pebbles, and, rarely, quartzite. Simple scrapers dominate making up 40-50% of the assemblage but there are also bifacially retouched pieces, points and occasional denticulates and notches. The Levallois technique is not present.

Interpretation – Developed Tayacian

TORRE IN PIETRA, north of Rome (Mussi 1995; Palma di Cesnola 1996; Pipierno and Biddittu 1978)

Date – Middle Pleistocene

Handaxes – yes

Geographical location and climate – The assemblage was found in a redeposited volcanic tuff. The site is not in situ but consists of redeposited artefacts.

Archaeology

Excavation – 200m^2 have been excavated

Lithics – The lithic assemblage was manufactured on small pebbles of limestone and flint. The assemblage includes handaxes but also has a pebble tool component

Fauna – The faunal assemblage consists of horse, red deer, bovids and elephants with some carnivores and rhino.

Interpretation – Acheulean

TORRE PAGLIACETTO, n. of Rome (Palma di Cesnola 1996; Villa 2001)

Date – Late Riss-Wurm interglacial.

Geographical location and climate - Located near the site of Torre in Pietra just north of Rome.

Stratigraphy - The pre-Mousterian industry is located at the top of the sequence, on top of the upper travertines. The bottom part of the upper travertines contains imprints of maple leaves and others consistent with a very advanced period of the Riss-Wurm interglacial. There are also volcanic deposits present

Archaeology

Lithics – The industry is on flint pebbles and consists of over 300 tools of average and small dimensions. Levallois is present but only weakly. The cores are often discoidal. Racloirs are dominant in the retouched tools and points are equally frequent. Denticulates and notches are present in smaller numbers. There are also examples of 'scraper choppers'.

Interpretation – It is seen as an important site in the developed and final Acheulean.

VENOSA LORETO, Potenza, Basilicata (Palma di Cesnola 1996; Molines 1999; Mussi 2001)

Date – The Tayacian at this site is estimated to be c. 500ka but the only dated level is below the archaeological horizons where the Brunhes/Matuyama horizon has been identified by palaeomagnetism (c.700ka).

Handaxes – Handaxes are present in some layers, lacking in others.

Geographical location and climate – This site is located in the Venosa basin in the Apennines of southern Italy. The archaeology is associated with deposits that represent a localised fluvial-lacustrine Pleistocene sequence.

Stratigraphy – A 30m stratigraphic sequence with 42 levels has been described with archaeological deposits in levels 21, 18 and 3. The site at Loreto contains horizons of both Tayacian and Acheulean industries. The human activity is associated with two horizons both rich in volcanic elements either side of a lacustrine horizon: Both show sporadic occupation, with the earlier slightly less dense.

Archaeology

Excavation – The site was excavated in the 1960s and again in the 1970s and an area of around 20 square metres has been excavated

Lithics – The industry is principally in flint and has not been fully analysed but preliminary studies suggest it contains scrapers, denticulates, notches and Quinson and Tayac points, quina retouch is also present. The flake butts are plain and strongly inclined and the dimensions average: 40mm-90mm. Choppers represent c.17% of the total industry and cores 0.17%. There is also one possible 'amygdaloid' biface c. 100mm long but this interpretation is questioned.

Fauna – The fauna at the site indicates a period of prairies with vast forests and rivers. Immediately overlying the Tayacian deposits the avifauna suggests cold climates, possibly at the end of the Mindel.

Interpretation – The lower habitation surface consists of a large density of objects in flint and bone remains. The density is greater to the south and claims have been made for evidence of working in situ. The bones are rarely complete and show signs of being deliberately smashed at the ends along with decarnation marks and has been interpreted as a butchery site.

VENOSA-LORETO, Basilicate, Potenza province (Palma di Cesnola 1996; Molines 1999; Mussi 1995)

Date – Middle Pleistocene?

Handaxes – none.

Geographical location and climate – located on the surface of the high terrace of Cammera (420m above see level)

Stratigraphy – The deposit containing the artefacts consists of a continental conglomerate known as 'pudding of Irsina'. This coglomerate is dated to the Villafranchian and rests on Calabrian marine clays.

Archaeology

Lithics – A pebble tool industry on flint and quartzite.Two distal bifacial choppers, one lateral unifacial chopper and two denticulated scrapers, a thick carinated scraper and a discoidal core have been found.

Interpretation – A limited assemblage but considered to be sufficient to show a Lower Palaeolithic pebble tool culture presence.

VENOSA-NOTARCHIRICO, Basilicata (Belli *et al.* 1991; Cassoli *et al.* 1993; Mussi 1995, 2001; Piperno 1999)

Date – Middle Pleistocene

Handaxes – few/none

Geographical location and climate – The site is located in the Venosa Basin and the archaeological levels have been covered by low energy waterlain deposits associated with a lake shore.

Archaeology

Excavation – An area of c. 500m^2 has been excavated. 12 levels have been identified in a stratigraphic sequence of 7m.

Lithics – The lithic technology is similar between levels.There are limestone choppers and chopping toolsand flint artefacts including some pointed bifaces, denticulates and scrapers. 41 artefacts in all

Fauna –The skull and mandible of an elephant were found in natural position along with red deer and fallow deer and bovids. Arguments have been made for active butchery of the animal remains but there are no cutmarks.

VISOGLIANO, Duino-Aurisina, Trieste (Abbazzi *et al*. 2000; Palma di Cesnola 1996)

Date – The whole sequence is attributed to the Mindel.

Handaxes - none

Geographical location and climate - The site is located in the Karstic region of Duino-Aurisina and is situated at roughly 100m above sea level. It consists of a rock shelter where the roof has collapsed, located on the side of karstic cave.
Climatologically levels 39-36 are warm, temperate and humid, 33-26 are indicative of a progressively harsher environment – pleniglacial, 25-24 are 'cataglacial' very marked continental climate, and the cycle is repeated for the upper part 23-10.

Stratigraphy - The stratigraphic sequence is complex but broadly is as follows (top to bottom): (A) red silty clays resulting from a strong pedogenetic process, probably associated with the Mindel-Riss interglacial, this layer overlies the collapse of the shelter; (B) beds 3-13: fine sediments, probably eolian in origin, possibly loess, with an intermediate level of coarse collapse; (C) beds 14-20: blocks and cryoclastic gravel in a brown silty eolian deposit; (D) beds 21-23: clayey-silty orange deposit with scarce gravel; (E) beds 24-36: slabs, blocks and cryoclastic gravel; (F) beds 37-39: colluvial sediments. The whole sequences is c. 8m deep and preceded by a breccia located some distance away, although unfortunately there is no direct stratigraphic sequence connecting the two.

Archaeology

Lithics – The Tayacian industry has been recovered from 4 main horizons: the breccia B, and beds 39-37, 25-22 and 13 of the rockshelter. The industry from the breccia is in limestone, flint and 'vulcanite' and consists of 13 choppers (9 unifacial and 4 bifacial), 89 flake tools. On the whole the dimensions are small, the scraper index high with simple types dominating. Denticulates aren't particularly frequent, nor are notches.

The industry in beds 39-37 of the rockshelter is nearly entirely on flint and is very limited consisting of 1 unifacial chopper and 48 flake tools, mainly scrapers but also notches and a piercer. Average size is 20-30mm.

The industry of beds 25-22, again nearly entirely on flint, consists of 60 flake tools with no choppers. There is a steep increase in scrapers and a decrease in denticulates. There is only one Tayac point.

The industry in bed 13, the uppermost archaeological horizon, is very poor there are only 23 tools in flint and as many in 'vulcanite' but the dimensions suggest a greater use of vulcanite. The quantities and percentages of different types ore very similar to bed 25-22, with the sole exception of a possibly slightly higher Charentien index.

Fauna – Faunal remains are good and micro and macro fauna indicate an interstadial environment. This is the only Tayacian site to have produced human remains: an upper premolar and a mandible fragment of H. erectus.

Interpretation – Categorised in Palma di Palma di Cesnola's overview of the Palaeolithic of Italy as an ancient Tayacian site. The excavators interpret the last two levels as Tayacian in the sense of De Lumley with the earlier two levels indicative of a more archaic form, richer in denticulates, similar to that at Isernia la Pineta.

ZAMBRONE, nr Tropea (Palma di Cesnola 1996)

Date – Middle Pleistocene

Handaxes – A single 'proto biface'.

Geographical location and climate - This site is located on a terrace c. 70m above sea level not far from Tropea.

Stratigraphy - The industry is found in a palaeosol lying over gravels which in turn overlie a marine deposit and follow a phase of marine erosion. This sequence is also identified at nearby Jona but for the sites of Zambrone 1 and 2 and Potame the geological context is less clear.

Archaeology

Lithics – The raw material is quartz, schist and more rarely quartzite and granite. Unifacial choppers dominate the assemblage, and lateral choppers are more frequent than distal. The pieces vary in size from 50mm to 150mm. There is a single proto biface and discoids and polyhedroids are also associated. Denticulates dominate the flake tool assemblage followed by scrapers which are often carinated.

Interpretation – It is maintained that the sites of Zambrone 1, 2 and Jona are a more archaic facies like that at Colle Marino in Latium, whereas the industry at Potame is more similar to more evolved forms like at Casella.

ZANNINI I-V, Alento River, Abruzzes (de Lumley 1976c)

Date – The date of the terrace deposits is unknown.

Handaxes – None.

Geographical location and climate – An open air site located on the terraces of the River Alento.

Stratigraphy - The geological stratigraphy is composed of alluvial sands and gravels overlying tertiary clays.

Archaeology

Excavation – The site was excavated and surveyed in the 1950s and 1960s.

Lithics –Like Mont Gargano and Madonna del Freddo the 'ancient Clactonian' artefacts are in a secondary deposit and many display 'pseudo retouch'. The exact number of tools is unknown but scrapers, denticulates, notches and becs are identified and the tools vary in size from 30-126mm. The flakes are typically short with typically Clactonian bulbs and platforms. There are also a number of multidirectional cores of pyramidal/sub-pyramidal shape.

MONACO :

LA GROTTE DE L'OBERSAVATOIRE (de Lumley 1976a)

Dated to the Riss.this site has an industry on limestone with abundant flakes and pebble tools although there are three crude bifaces.

BOULEVARD DE BELGIQUE (Burdukiewicz 1993, Svoboda, Ložek, and Vlček 1996)

Tools found in inter-Mindel deposits, including a chopper.

POLAND:

RUSKO 33 and 42, Lower Silesia, Southern Poland (Burdukiewicz 2003)

Date – MIS 9 by geological comparison with dated deposits elsewhere.

Handaxes – Absent.

Geographical location and climate – These sites were found in the JARO Enterprise Kaolin opencast mine on the northern slopes of the Strzegom Hills. At Rusko 33, the smallest, in terms of assemblage size, of the two, the artefacts are considered to be in primary, or disturbed primary context on the shore of a slow flowing river. The much larger assemblage of Rusko 42 was found on the sandbank of a stream, again probably in disturbed primary context.

Stratigraphy – The artefacts from these localities were found in fine fluvial sand and sediments of the Odranian glaciation (MIS 8?) overly both localities (Burdukiewicz 2003)

Archaeology

Excavation – The site was discovered during the prospetion of open cast mines in the area by geologists undertaking geological mapping of the area. The site has now been subject to more detiled exploration by the Polish Committee of Scientific Research (Burdukiewicz 2003).

Lithics – Rusko 33 had yielded c. 350 artefacts while Rusko 42 has yielded c. 3700. The artefacts from both assemblages are small flakes and chips in flint with few cores. From Rusko 33 retouched tools make up only 10% of the assemblage. The raw material is reported as not limiting the size of the artefacts, rather smaller pebbles were deliberately selected.

Fauna – There was virtually no fauna associated with the Rusko assemblages. At Rusko 33 the assemblage was 'associated with a tooth of a big hoofed animal' (Burdukiewicz 2003: 68) while at Rusko 42 the assemblage was associated with the tooth of a large pike (*Esox lucius*).

Interpretation – These sites are interpreted as being part of the same microlithic complex as Trzebnica 2 and Bilzingsleben. The excavators suggest that many o the micorlihics tools may have been hafted (Burdukiewicz 2003).

TRZEBNICA 2, Lower Silesia, Southern Poland (Burdukiewicz 1993 cited in Svoboda, Ložek and Vlček 1996, 2003)

Date – MIS 9

Handaxes – Absent.

Geographical location and climate – The site was found in an open cast mine on Winna Gora, a hill to the east of Trzebnica, a small town 15 km north of Wroclaw.

Stratigraphy- At the northern face of the quarry false-bedded light-grey quartz sand (preglacial deposit) overlies Upper Miocene clay, while at the southern face there are exposures of glacial sediments, till, dated to the Sanian (Elsterian) Glaciation by geological comparison. The Lithic artefacts are covered by Sanian deposits. 1 m above the lower archaeological horizon an upper archaeological horizon was found. These were less numerous and covered in silty diamicton believed to originate from meltwater.

Archaeology

Excavation – The first artefacts were discovered during a survey of the mine in 1987 (Burdukiewicz 2003)

Lithics – The industry includes microcores, larger choppers and small flake tools including side scrapers, denticulates and borers. Some 1400 artefacts have been recovered in all, from two arcaheological horizons. All of the larger choppers and hammerstones were recovered from the lower of the horizons. With the exception of some of the macro tools the artefacts are made on flint. The excavators report that the size of available raw material placed no restriction on the size of the artefacts produced (Burdukiewicz 2003).

Fauna – The faunal assemblage are typical of forested and open environments: elk, red deer, pig, bison, horse, rhinoceros.

Interpretation – Interpreted alongside Rusko 33 and 42 as being part of the microlithic culture of which Bilzingsleben is a part. The excavators suggest that the microliths may have been hafted (Burdukiewicz 2003).

PORTUGAL:

In Portugal as a whole there is almost a complete absence of Lower Palaeolithic assemblages without bifaces (Raposo, Margarida Salvador, and Pereira 1996). However a number of 'archaic-acheulean' assemblages are noted: Monte do Famaco, Rôdâo, middle Tagus; Tojal quarry; Forno Valley, lower Tagus, Alpiarça. Recent dating of some of the earliest assemblages has concluded that there is no solid evidence for hominin occupation prior to MIS9 (Oosterbeek *et al.* 2010)

ACAFORA, see PORTUGUESE LITTORAL

AMOREIRA, Alta Ribatejo (Oosterbeek *et al.* 2010; Rosina *et al*. 2005)

This is a mixed assemblage, therefore difficult to date although the collections from this site are considered to represent a Lower/Middle Pleistocene assemblage that has been mixed with later Holocene activity at the exposed terrace deposits.

FONTE DA MOITA, Vila Nova da Barquinha, Alta Ribatejo (Oosterbeek *et al.* 2010; Rosina *et al*. 2005)

Date – unknown

Handaxes – none

Geographical location, climate and stratigraphy – The site is located on a Q3 terrace, the middle terrace, of the Tagus River. The stratigraphic sequence is c. 3.5m thick. At the base of the sequence are Miocene sandy clays and the upper part of the sequence is characterised by colluvial deposits (Rosina *et al*. 2005). The lithic implements came from the basal conglomerate

Archaeology

Excavation – The site was excavated as a salvage excavation prior to construction in May and June 1998.

Lithics – The artefacts are primarily manufactured on quartzite pebbles, although quartz, gres, flint and granite are also used. Two reduction sequences have been identified: one for worked pebbles and one for flakes, both are short and simple. The assemblage is described as having an archaic appearance with considerable variation, high levels of cortical artefacts and high frequency of pebble tools (Rosina *et al*. 2005). The worked pebbles are redominantly in quartzite and range from 51-90mm in length with the majority of the worked edges on the distal edge, and unifacially worked. The flakes are on average 62mm long and the majority have some cortex. Over 50% are broken. The dorsal scar pattern is predominantly unipolar.

Fauna – Absent (not preserved).

Interpretation – The assemblage represents a Lower Palaeolithic industry

LAREDO DAS CORCHAS, see PORTUGUESE LITTORAL

LEIAO, see PORTUGUESE LITTORAL

MAGOITO, see PORTUGUESE LITTORAL

MINHO, north Portugal (Oosterbeek *et al.*2010; Raposo 1996)

A number of sites withough handaxes have been identified from this area, although they are largely associated with coastal terraces and have assemblages of only a few hundred. Dating for these assemblages in unknown but provisional dating of MIS7 and 6 has been suggested (Raposo 1996). They include: Formation M9 and M10, and Vila Praia da Ancora Norte.

PRAIA DA AGUDA, see PORTUGUESE LITTORAL

PORTUGUESE LITTORAL (Oosterbeek *et al*. 2010; Raposo 1985; Santonja and Villa 1990)

Laredo dsa Corchas, Leio, Magoito, Praia da Aguda and Acafora are all sites located on the Portuguese Littoral and claimed to be Lower Pleistocene in date (Raposo 1985) although the dating is on the archaic nature of the artefacts rather than stratigraphic or absolute dating (Oosterbeek *et al*. 2010; Santonja and Villa 1990).

RIBATEJO DA PONTE DA PEDRA, Alta Ribatejo (Oosterbeek *et al.* 2010)

An assemblage of over 1000 artefacts with no bifaces located on the fourth terrace deposit. The site has been dated to 302 ± 12 ky (OSL) and 175 ± 6 ka (U-series).Probably of a similar age to Fonte da Moita.

<u>ROMANIA:</u>

AMĂRĂSTI-FĂRCAŞ, Plosca Valley, Dolj (Cârciumaru 1996)

Eight quartzite artefacts were recovered close to the remains of an elephant (*Elephas trogontherii*) dated to the Middle Pleistocene.

BUGIULEŞTI, Valea lui Grăunceanu, Romanian Plain (Cârciumaru 1996; Fridrich 1976)

Date –Middle Pleistocene

Handaxes – none

Geographical location, stratigraphy and climate – The site is located in fine sandy deposits associated with the mouth of a river open into an Early Pleistocene lake.

Archaeology

Lithics – Three manuports (pebbles believed to have originated 40km away) have been reported along with claims for numerous bone tools. However the lithic assemblage is consists of a single chopper.

Fauna – Faunal remains were abundant (over 36,000 pieces of bone were recovered) and dated to the Villafranchian. The faunal assemblage is dominated by deer and horse.

Interpretation – A controversial site with somewhat limited claim for the presence of an industry.

DÂRJOV VALLEY, Romanian Plain (Cârciumaru 1996)

Odd finds of pebble tools have been made in deposits that correspond to terraces of the Olt River, estimated to be pre-Gunz-Mindel interglacial.

SIBIU (Cârciumaru 1996)

Various isolated finds have been made in secondary context in this area including flakes and pebble tools.

VALEA LUPULUI, Iassi (Cârciumaru 1996)

A Clactonian flake is reported from sandy deposits at the base of a lower terrace of the Bahlui. The same sands contained remains of wooly rhino and mammoth. However, the piece is believed to be derived from earlier deposits.

SLOVAKIA:

BRATISLAVA REGION (Bárta 1983; Valoch 1996)

A number of pebble tools have been found in the area around Bratislava.

HRANOVNICA (Valoch 1996)

Isolated finds of pebble tools, probably attributable to the Holstenian.

SEŇA, Košice district, E. Slovakia (Fridrich 1976)

A single find of a jasper flake from terrace deposits of the Hornád river. Two further possible flakes were recovered.

SOBOTISKO, Beharovce, Spiš, northern Slovakia (Hausmann and Brunnacker 1988; Valoch 2003)

Date – There is one date associated with the artefacts from an unknown location of >206.9kya from U/Th analysis (Hausmann and Brunnacker 1988).

Handaxes – Absent.

Geographical location, climate and stratigraphy – This site is a travertine locality with two layers of industry (Valoch 2003).

Archaeology

Lithics – The two layers of archaeology have produced over 500 artefacts, including 27 retouched tools and 15 cores. The majority of this assemblage is manufacture in quartz with the remainder in radiolarite and other rocks.

Interpretation – Middle Palaeolithic Taubachian (Valoch 2003).

VYŠNÉ RUŽBACHY (Valoch 1996)

Isolated finds of pebble tools, probably attributable to the Holstenian.

SPAIN:

ATAPUERCA, Burgos (Barras de Aragon and Sanchez 1925; Bosca 1916; Fernandez-Peris, Calatayud, and Martinez-Valle 2000; Fernández Peris 2006;

Fernandez Peris, Guillem, and Martinez-Valle 1997; Puig and Larraz 1896; Villanova and Piera 1893)

Date – Archaeological horizons date from c.900ka.

Handaxes – Handaxes are present in most horizons but are absent from TD6 and below as well some levels within TD 10

Geographical location and climate – A network of cave deposits in the Sierra de Atapuerca.

Archaeology

Excavation – The site has been excavated since 1978 and a huge quantity of lithic and faunal material has now bee recovered from levels dating from nearly 1mya to c. 200ka.

Lithics – The lithics include a number of handaxes, flake tools and prepared core technology in the upper levels.

Fauna – Abundant fauna including important quantities of hominin remains

Interpretation – The assemblages without bifaces are generally early in the sequence or associated with short occupations.

BAZA BASIN, Andalucia (Santonja 1996; Scott, Gibert and Gibert 2007; Vega 1989)

The Baza Basin near Orce in Andalucia in southern Spain has yielded a number of localities with very early Pleistocene and Plio-Pleistocene fauna. At some of these localities stone artefacts have also been found. Baranco Leon 5 and Fuenta Nueva 3 have yielded stone artefacts, both of which are dated at over 1mya (Scott *et al*. 2007).

COVA DEL BOLOMOR, La Valldigna, Valencia (Fernández Peris 2006; Fernàndez Peris, Calatayud, and Martinez-Valle 2000; Fernandez Peris, Guillem, and Martinez-Valle 1997; Santonja *et al*. 2000)

Date – Sedimentary, macro and micro-fauna suggest that the site was occupied between 350kya and c.100kya.

Handaxes – None.

Geographical location, climate and stratigraphy – The site is located on the eastern side of the ravine/gully of the Cova del Bolomor that runs north–south on the southern side of the Valldigna valley roughly 2km to the south east of Tavernes de la Valldigna. The Mediterranean coast is visible to the east of the valley.

Lithostratigraphy suggests four paleo-climatic phases:

Bolomor Phase 1 (levels XVII to XV) cold climate, humid, accumulation of exogenic material and a breccification of sediments. In level XVIIa amino acid racemisation date of 525000 +/- 125000BP.

Bolomor Phase II (XIV- XIII) climatic cycle with interstadial, warm and damp which led to occasional flooding of the cave. In level XIV TL dates of 233000+/- 35000 and 225000 +/- 34000 BP, level XII 152000+/-23000BP.

Bolomor Phase III (XII to VIII) Beginning of a cold, wet period developing into a drier, harsher climate (level XII), later returning to a temperate damp period (VIII) – MIS 6 or Riss III alpino.

Bolomor Phase IV (VII to I) Temperate and wet phases of the last interglacial OIS 5 TL 121000+/- 18000BP.

The levels that are of interest here are Bolomor Phase 1, with two archaeological levels XVII, XV, and Bolomor Phase II with a single archaeological horizon – level XIII.

Archaeology

Excavation – Bolomor was first identified as a site at the end of the 19th century by Juan Vilanova y Piera. The search for treasure in the 19th century destroyed a big part of the deposits at the site. Fernandez Peris and Calatayud began excavations in 1989 on behalf of the 'Servicio de Investigación Prehistórica de la Diputación de Valencia'. Over fifteen seasons of excavation have been undertaken with excavations ongoing. The first season excaated a sondage that covered the 42 stratigraphic levels and the last few years in extension that concentrated on the upper levels.

Lithics – Flint, quartzite and limestone are the dominant raw materials, all locally sourced in the form of flint nodules and small pebbles (documented on geological maps from the area), probably from river. Flint is the rock of choice in all levels c. 75% followed by limestone, then quartzite. The basal levels at Bolomor show a strong use of quartzite. In the lower levels cortical pieces have been selected more often to be transformed into tools. Denticulates characterise basal levels along with an absence of bifaces and a presence of large core tools not present in the upper layers. There is no Levallois, few scrapers, and an absence of limace types.

Fauna – Faunal preservation is variable due to varying conditions of the cave, however overall the faunal assemblage is extremely rich. There is evidence for both cut marks and carnivore and rodent chewing, however the ratio of cutmarks and gnaw marks suggest that the faunal assemblages are largely anthropogenic. Horse and red deer dominate in the lower levels, with some megaceros. There are also human remains: one molar of infant *H. s. neanderthalensis* from IV c. 130000bp and cranial fragments.

Interpretation – The assemblage is interpreted by Fernandez Peris as related to the Meridional European industries e.g. Baume Bonne D, Caune de l'Arago, Sedia del Diablo, Monte della Giovie, and forms part of a picture of this part of the peninsula which suggests a variant of the later Acheulean lacking bifaces.

CUESTA DE LA BAJADA,Teruel (Querol and Santonja 1983; Santonja 1996)

Date – Luminescence date for below level 19 is 137,900 +/- 10,000 BP – MIS6 – but this is a minimum date. Fauna places the assemblage within the second half of the Middle Pleistocene (Santonja 1996).

Handaxes – bifaces are rare

Geographical location and climate – Located on the left shore of the Alfambra River, very close to Teruel. The climate during occupation was temperate but slightly colder and drier than today.

Stratigraphy – Fluvial terrace and Lacustrian deposits Very fine grained deposits.

Archaeology

Excavation – The site covers c.1000m^2 27m^2 and was excavated between 1990 and 1994 following discovery of fauna at the site. It is one of the few open air sites in this area with a known chronology.

Lithics – Levels 19 to 16 contain more or less disturbed material. The raw material worked is always local: Quartzite, limestone and chert, but they seem to have avoided the limestone and sought out chert. The local material is limited by the pebble size, largely [pebbles of c. 3cm (Santonja 1996). The industry size ranges between 7 and 65 mm. The cores tend to be heavily exploited and tend to show erratic breakage patterns resulting in many chunks. There are only 8 cores from the lower levels which include some Levallois.

Fauna – Funal assemblage includes *Elephas* sp., *Equus caballus, Dicerorhinus hemitoechus, Erinaceus, Crocidura, Oryctolagus* cf. *cuniculus, Arvicola* cf. *sapidus*, *Microtus brecciensisdentatus, Pitymys* cf. *pyrenaicus.*

Interpretation – The nature of industry is strongly related to the raw material, however complete lack of large Acheulean type tools and presence of discoidal and Levallois suggests that this is more likely an Early Middle Palaeolithic assemblage.

EL ACULADERO, Puerto de Santa Maria, Cadiz (Bordes and Thibault 1977; Querol and Santonja 1983; Santonja and Villa 1990)

Date – Unknown, problematic, possibly at beginning of an interglacial. The excavators interpreted this as possibly the Mindel-Gunz.

Handaxes – Absent. The excavators undertook experimental knapping to demonstrate that handaxes could be made on the available raw material.

Geographical location, climate and stratigraphy – The site isassociated with an open air beach deposit over large area to the west of Puerto de Santa Maria in the north east corner of the bay of Cadiz (Map 1.061: GR 363457, 023403), south west Spain. It is to the south of the Guadalete River. The Pleistocene deposits consist of clay, sand and limestone, overlain by gravels, and again overlain by sand. The industry appears to have been found in a single horizon (level 4) consisting of gravels with cold climate indicators including ice wedges and solifluction. In level five, below the archaeological layer, is a deposit relating to a warmer climate. Therefore the human occupation seems to coincide with a cold phase – the excavators describe this as possibly Gunz date and the industry as pre-Acheulean.

Archaeology

Excavation - The archaeological level was discovered in 1970 by M. Claude Viguer, a geologist from the University of Burdeos, in the course of the research for his doctoral thesis. The artefacts were identified by Bordes and they jointly published in 1971. In 1973 excavation began in the name of Prof. Claude Thibault, a quaternary scientist from the University of Budeos, under the supervision of Mª Angeles Querol, Prehistoric department of the University of Complutense. The motivation for excavation was the 'probable great age of the pebble tools which occurred in a stratigraphy that began in the upper Pliocene and continued into the Pleistocene' (Querol and Santonja 1983). A conference on the site was held by Thibault in 1975 in the Société Préhistorique Française in which he suggested a possible Gunz age for the sequence and drew similarities with the pebble tool culture of Morocco. An area of 17m by 9m was excavated between 1973 and 1979 with an additional 28 1m by 1m test pits excavated over a wider area in 1980. In addition, they surveyed the area from Chipiona to Algeciras along the coast and found various locations with archaeological deposits.

There are three sublevels of archaeology at El Aculadero– upper, middle and base. The upper level has pebbles lying flat with scarce gravel. The middle has a sand and gravel matrix throughout and the pebbles are mixed up. The pebbles in the base layer almost always rest horizontally with scarce gravel surrounding them. However this division is adopted with some caution.

Lithics – The Bordes typology was originally used (by the man himself) but was adapted as it was found to be too elaborate for such a simple 'archaic' industry. Between 1973 and 1979 some 1507 flakes and 1293 cores were recovered (a further 19761 were recovered but deemed inconclusive). The maximum pebble size is 110mm and majority that have been worked are 40-60mm (majority unworked 20mm). The majority of flakes have some cortex (76.9%), 'orange slice' type flakes are very frequent (20.2%), majority of flakes have natural butts (60.6%). The low flaking index (5.6 - 3.3) suggests that there was not a systematic exploitation of material to produce flakes. Of the cores 33.8% are centripetal cores, with peripheral preparation in 26.3%. There is an absence of Levallois (8 untypical flakes) but the excavators suggest the presence of 'proto-Levallois'. 38% of the recognised tools from the site are flake tools- the retouch is not very invasive, there are very varied scrapers, denticulates, notches, Tayac points.

Fauna –

Interpretation – Bordes and Thibault suggest that there is a possibility of two different episodes of human occupation at El Aculadero separated by an episode of eolian activity with an early glacial age (Santonja and Villa 1990). The dating of the site remains problematic and many now consider the Middle Plesitocene date to be too ambitious.

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EL CASTILLO, Cantabria, northern Spain (Santonja and Villa 1990)

A cave site with Acheulean material at the base. However this was largely excavated at beginning of the 20th century and many artefacts and information has been lost. There are large numbers of denticulates, side scrapers, choppers and partial/asymmetrical irregular bifaces but there are only c. 127 pieces in the lower levels. Again dating is absent but below Mousterian layers so assumed pre-Wurm.

GUADALQUIVIR VALLEY, Andalucia (Díaz del Olmo, Vallespí and Baena Escudero 1993; Santonja 1996)

Generally instances of archaic industries have been reported from the terreaces of the Guadalquivir largely on local cobbles. Generally these consist of very small assemblages and are associated with terrace 6.

PINEDO, near Toledo, Meseta central (Santonja 1996)

Date – This is one of the oldest sites in central Iberia and is described as Middle Pleistoceen from fauna.

Handaxes – Handaxes are present, although non-classics.

Geographical location and climate – The site is located on the terrace deposits of the Tagus. The environment would have been mosaic woodland and open grassland.

Stratigraphy – The site is 25m^2 with 4.5m thick deposits. It is in a secondary context but with a well defined concentration of artefacts.

Archaeology

Excavation – The site was excavated between 1972 and 1974

Lithics – There are artefacts in quartzite, flint and quartz and three groups of artefacts have been identified on the basis of the condition of the artefacts. Bifaces are present but very varied and asymmetrical or irregular, trihedral picks, there are also choppers and pebble tools.

Interpretation – It has been compared to Aculadero and there are many similarities but it has bifaces.Early Acheulean.

PUIG D'EN ROCA, Cataluna, NE Spain (Santonja and Villa 1990)

This site lacks bifaces but has several hundred artefacts in quartz. The artefacts are within or on top of a colluvial deposit above the lowest terrace of the Ter. The date is unknown but believed to be Middle Pleistocene.

VILLARMERO, Burgos (Santonja 1996; Arnaiz and Mediavilla 1986)

Date – Middle Pleistocene

Handaxes – None.

Geographical location and climate – Located northwest of Burgos on the Ubierna the archaeology was found in a colluvial conglomerate.

Archaeology

Excavation –

Lithics – The assemblage consists of c. 175 artefacts. The tools are largely scrapers and denticulates and no bifaces have been found although two cleavers with a symmetrical shape are reported.

Fauna – None

Interpretation – The assemblage is interpreted as a Middle Pleistocene assemblage without bifaces.

UKRAINE

KOROLEVO, Transcarpathia (Villa 2001; Koulakovska, Usik and Haesaerts 2010)

Date – Currently the earliest levels post date the Brunhes-Matuyama horizon with the assemblage from complex VI dated to approximately MIS11, although there have been claims that assemblages have been found associated with the Brunhes-Matuyama boundary.

Handaxes – Absent although there are some bifacially worked pieces and some possible fragments from bifacial tools reported.

Geographical location and climate – The archaeological deposits are located on a high terrace (c. 80-100m above sea level) of the Tisza River near to the boarder between Romania, Hungary and Ukrane.The modern Tisza cuts through the Carpathian foothills through the Puszta plain to the Danube. The site is a multiperiod palaeolithic site with archaeological layers from Lower to Middle Palaeolithic.

Stratigraphy – The artefacts are within a loess-paleosol sequences onverlying a volcanic deposit above the modern floodplain. The stratigraphy is complex and consists of alternating loams and seven palaeolsols, at the base of palaeolsol VII the Brunhes-Matuyama boundary. Within this sequence 15 archaeological horizons have been identified on the basis of lithic condition and stratigraphic context. The oldest assemblage is found towards the top of palaeosol VII (complex VI) as well as within alluvial deposits predating the Brunhes-Matuyama boundary (complexes VII and VIII). However a reanalysis of the sequence (Koulakovska *et al*. 2010) has concluded that the earliest archaeological units cannot be substantiated and therefore complex VI is the earliest demonstrable archaeological horizon.

Archaeology

Excavation – The site was excavated from the mid 1970s until the 1990s by V. N. Gladilin and the Archaeological Museum, Kiev. The site had been subject to quarrying and excavations focused on the eastern and northern edge of the quarry. In the east (known as Beyvar) a large number of lithics had been collected but the loess-palaeosol sequence was limited. While in the north (known as Gostry Verkh) the loess-palaeosol is up to 14m thick but with a less well documented assemblage. It is this eastern area that is the basis of the reference stratigraphic sequence for the site.

Lithics – The assemblage is mostly on andesite which was locally available, pebbles of other materials were also used. It is a substantial Middle and Lower Palaeolithic assemblage. Level VI assemblage contains no evidence of bifaces or Levallois and the interpretation of the srtefacts is ongoing. The most recent analysis suggest some working by ‘shattering’ rather than knapping per se but the hardness of the raw material and the difficulty in identifying knapping scars may have affected this. Scrapers make up the majority of the retouched tools, followed by denticulates. The site is reported as having no bifaces but see Koulakovska *et al.* 2010, figure 8, p.124. The earlier assemblage from level VII consists of only 30 artefacts which were recovered as individual finds during early excavations

Interpretation – This is an important site which has undergone some reinterpretation. There appears to be evidence of a very early Lower Palaeolithic assemblage greater than 500ka although the assemblage is extremely limited. The main Lower Palaeolithic assemblage seems to correspond with MIS11 and has no handaxes reported although bifacial elements are present. Currently this site is isolated but further investigations could be fruitful.